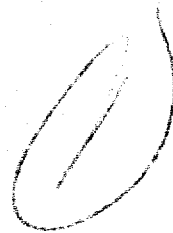


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ABSTRACT

The absorption by water vapor between 2800 and 4500 cm^{-1} has been investigated. Spectra have been obtained for samples at pressures from 0.48 torr to 10 atm, and with absorber thicknesses varying from 8×10^{-4} to 0.7 gm cm^{-2} . Transmission spectra are shown along with extensive tables of transmittance, integrated absorptance, and the integrated absorption coefficient. Results are presented for samples chosen to provide information about the strengths, widths, and shapes of many of the absorption lines. The combined strength of the ν_1 and ν_3 bands has been found to be $28 \pm 1.5 \times 10^4 \text{ cm}^{-1} \text{ gm}^{-1} \text{ cm}^2$; and the strength of the $2\nu_2$ band is $3.5 \pm 0.7 \times 10^3 \text{ cm}^{-1} \text{ gm}^{-1} \text{ cm}^2$.

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SECTION 1

INTRODUCTION AND SUMMARY

Nearly all the absorption by water vapor in the $2800 - 4500 \text{ cm}^{-1}$ region is due to the ν_3 , ν_1 , and $2\nu_2$ bands.¹ The origins of these bands for H_2O^{16} , the most common isotope, are at: ν_3 , 3755.92 cm^{-1} ; ν_1 , 3657.08 cm^{-1} ; and $2\nu_2$, 3151.60 cm^{-1} . Their relative intensities are approximately $\nu_3:\nu_1:2\nu_2 = 120:12:1$. Besides the H_2O^{16} lines, there are other isotopes whose normal abundances are: H_2O^{18} , 0.20%; H_2O^{17} , 0.037%; and HDO , 0.027%. Additional lines are also due to transitions in which the lower level is vibrationally excited; but at atmospheric temperatures, the only level of any significance is the lowest, ν_2 . The abundance of molecules in this level is only about 0.04% as great as that in the ground state at room temperature; therefore, even its contribution is slight.

Several factors make it important to have a detailed understanding of the absorption in this region: The absorption bands are sufficiently strong that the H_2O content can be measured spectroscopically by various types of instruments such as high-altitude balloons or aircraft with the sun serving as a radiation source. Good detectors and sources exist and the background emission by the earth and the reflected solar radiation are relatively low. Thus, this region has several advantages for many types of communication systems.

Considerable work has been done previously on the absorption in this region by Howard, Burch and Williams² and by Burch, France and Williams.³ From the results of these workers, it is possible to determine the average transmittance for a wide variety of samples over a spectral interval greater than approximately 10 cm^{-1} wide, provided the sample is near room temperature and the pressure is uniform. For many engineering purposes, this is

adequate; but, in order to account for variations in temperature, pressure and H₂O concentration over the path, it is necessary to know strengths and widths of the lines. Because of the relatively low spectral resolution used in the previous work, the results are not adequate for the determination of these basic line parameters.

Gates, et al¹ have calculated and tabulated strengths and widths of most of the lines in this region; but these calculations were necessarily based on limited data, some of which were not obtained for the purpose of providing this information. Furthermore, all the factors involved in calculating strengths and widths are not completely understood; therefore, the calculated values should be checked and possible corrections should be made.

The present investigation was undertaken for the purpose of supplying data from which the basic line parameters could be determined as well as to provide spectra to aid in interpreting atmospheric spectra. Information about the differences in the shapes and widths of self-broadened and N₂-broadened lines was also obtained; the results of this phase of the investigation appear in Section 3.

Spectra of more than 20 different samples in the 3847 - 3860 cm⁻¹ and 3895 - 3932 cm⁻¹ are shown in Section 4, along with tables of transmittance and integrated absorptance. These regions were chosen since they are particularly good for interpreting atmospheric spectra. They are relatively free of absorption lines of other atmospheric gases and the H₂O lines cover a wide range of strengths. The lower wavenumber region contains a few very strong lines, making it convenient for comparison with samples containing very little H₂O, such as the path between the sun and a very high balloon. The 3895 - 3932 cm⁻¹ region contains several reasonably well isolated lines which are much weaker, making it useful for the comparison of larger samples, such as the path traversed by solar radiation to a balloon or aircraft at lower altitude. The higher wavenumber region also contains a relatively clear window about 8 cm⁻¹ wide; careful investigation of this window could be useful in placing the zero absorptance curve on a solar spectrum.

Spectra of a few samples at 5 and 10 atm are shown in Section 5. Strengths of many of the lines can be obtained easily from these spectra, and the accompanying tables of $-\frac{1}{u} \int \ln T(\nu) d\nu$, where $T(\nu)$ is the transmittance and u is the absorber thickness in gm/cm².

Section 6 contains spectra of some large samples showing many very weak lines. Also included are spectra of some samples at low pressure which are useful for determining half-widths of many of the lines. Sections 4, 5 and 6 also contain tables of transmittance $T(\nu)$ versus ν and integrated absorptance $\int A(\nu) d\nu$ versus ν , where the values are calculated from the spectra shown.

SECTION 2

EXPERIMENTAL

2.1 GAS SAMPLING

Samples of H_2O and H_2O mixed with non-absorbing broadening gases were contained in two different absorption cells which have been described previously.⁴ The longer cell has a base length of approximately 30 meters and was used at path lengths from 121 to 933 meters. It is approximately 0.9 meters in diameter and can be evacuated to less than 1 micron of Hg or pressurized to as much as 2.5 atm. The shorter cell has a base length of approximately 1 meter and was used for paths between 2.10 and 32.9 meters. It can be evacuated or pressurized to as much as 15 atm.

Sample pressures less than approximately 0.06 atm were measured with a U-tube oil manometer, and those in the range $0.06 < P < 2$ atm with a U-tube Hg manometer. All pressures > 2 atm were measured with a bourdon-type gauge.

Gases were handled by the use of a manifold system attached to the absorption cells. N_2 and other broadening gases were obtained from commercial cylinders. Liquid H_2O was put in a metal container and "pumped on" for a few minutes to reduce the amount of dissolved gases before it was allowed to "boil" into the previously evacuated absorption cell. The liquid was usually heated in order to reduce the filling time.

A few samples were studied with the absorption cell heated several degrees above ambient in order to increase the partial pressure of H_2O without condensation. When measuring pressures of the samples in which p was greater than the vapor pressure at room temperature, the sample gas was

confined to the absorption cell and a small part of the manifold system which could be heated. The heated part of the system included a small U-tube containing vacuum pump oil. One leg of the tube was connected to the sample gas and the other to the part of the system including the pressure gauges. The pressure in the latter part was adjusted until the heights of the oil in both legs of the U-tube were the same. The pressure indicated by the gauges was then the sample pressure.

The absorber thickness u of H_2O was calculated for each sample at room temperature from the following equation.

$$\begin{aligned} u(\text{gm/cm}^2) &= 9.75 \times 10^{-7} p(\text{torr}) L(\text{cm}), \text{ or} & (2-1) \\ &= 7.41 \times 10^{-4} p(\text{atm}) L(\text{cm}); & (\text{gm/cm}^2 = \text{precipitable cm}) \end{aligned}$$

L is the path length in cm and p is the partial pressure of H_2O . The coefficient can be calculated on the basis of the perfect gas law. The above equation is valid for room temperature, 296°K , but it must be multiplied by $296/\theta^\circ \text{K}$ for other temperatures.

Two factors make it more difficult to work with samples containing H_2O than most other gases which occur in the atmosphere. The first is the relatively low H_2O partial pressures to which the worker is limited because of the low vapor pressure near room temperature. The second difficulty arises from the adsorption of H_2O on the walls of any container, particularly the absorption cell. Adsorption makes sampling of H_2O vapor difficult since the amount may be great and is dependent upon the nature of the surface and the temperature. Furthermore, the adsorption or the desorption process may require several hours to come to equilibrium. This produces uncertainties in the determination of the amount of H_2O vapor in the optical path of an absorption cell since the amount may change considerably during the course of a set of measurements.

As a typical example, in working with our large absorption cell we might calculate the amount of liquid H_2O which would be required to produce a partial pressure of 15 torr if it all appeared as vapor. If this amount were then put into the absorption cell after it had been evacuated, the partial pressure in the cell would be approximately 11 torr instead of the calculated value of 15 torr. Thus, we conclude that more than 25% of the H_2O admitted to the cell adsorbed on the walls during the filling process which required approximately 20 minutes. If the sample were allowed to remain for an hour, the pressure would have dropped to approximately 10 torr; twenty-four hours later it might be as low as 9 torr. Thus, we see that a lot of adsorption takes place within a few minutes, but considerable time is required for the sample to come to equilibrium.

As another example, if the cell were allowed to remain with 10 torr H_2O in it for several hours, then pumped to a pressure of 5 torr and all the valves closed, the pressure would increase to as much as 6 torr within an hour. Several more hours would be required for the pressure to become stable.

We see that as much as 30 to 50% of a sample put in the large absorption cell may be adsorbed on the walls. Therefore, fluctuations in this amount might cause serious errors in the determination of u . The percentage of the sample adsorbed on the walls of the shorter absorption cell has not been measured. Its surface-to-volume ratio is considerably greater, but the walls were honed in order to reduce the effective surface, and thus the amount of adsorption.

The partial pressure p , and thus the absorber thickness u , can be determined accurately for pure H_2O samples since p can be measured directly. But because of the large fluctuation in p which may occur after a sample of $H_2O + N_2$ has been introduced to the cell, the determination of the absorber thickness of such a sample is much more difficult. It is not safe to assume that p remains constant after adding N_2 ; therefore, p was monitored by the use of a dew-point meter installed inside the absorption cell. The apparatus contained a Peltier cooler which cooled a flat, polished surface approximately 0.5 cm in diameter which was illuminated by a small bulb. Condensation of H_2O on the polished surface was detected by the use of a small photocell. When the polished surface was dry, very little light was reflected to the photocell; but as condensation started, the thin film of H_2O scattered light to it. The temperature at which condensation started was measured by a small thermocouple fastened to the surface on which the condensation occurred. After a sample had remained in the absorption cell sufficiently long for it to reach equilibrium, repeated measurements of the dew point were consistent to less than $\pm 0.1^\circ C$.

In order to make a mixture of $H_2O + N_2$, the absorption cell was first evacuated and pure H_2O was added. N_2 was not added until the H_2O partial pressure was essentially in equilibrium. The amount of time required to approach equilibrium could be greatly reduced by first introducing more H_2O than would be required. This was allowed to remain in the cell for several minutes, then part of it was pumped out to give the desired pressure. After gaining some experience, we were able to obtain H_2O partial pressures to within two or three percent of their equilibrium value within a period of one or two hours.

Immediately before the N_2 was added, the pressure was measured and a dew point reading was made. N_2 was then slowly added to the absorption cell with the sample being mixed constantly by a small fan mounted inside the cell. While scanning the spectra, dew-point readings were periodically taken to monitor p . The dew-point reading of the pure H_2O sample whose pressure could be measured accurately served as a calibration for the dew

point apparatus. Thus, it was not necessary to rely upon the temperature calibration of the thermocouple or upon published values of vapor pressure at different temperatures. However, our dew-point readings for pure samples were always within a few tenths of a degree of the accepted values. Since p was allowed to approach equilibrium before the N_2 was added, the dew-point readings after the addition of N_2 were very nearly the same as those before. Thus, the dew-point apparatus served only as a monitor, and we were not dependent upon its absolute accuracy.

We investigated the possibility of the dew-point apparatus giving a different reading for the same p at different values of total pressure P . It was apparent that more heat was absorbed by the cooler at higher pressures since more current was required to cool it to a given temperature. If the heat flow caused a temperature gradient between the point at which the condensation occurred and the point at which the temperature was being measured, we would expect the temperature gradient to increase with increasing pressure. If this were true, one would then expect that the dew-point reading for a given p would depend upon P . In order to minimize this effect, we adjusted the apparatus so that the spot at which condensation was being observed was within two or three millimeters of the thermocouple used to measure the temperature. The surface joining these two points was made of a copper alloy with good heat conductivity so that the temperature gradient should be minimized. The leads to the thermocouple were made of fine wire to reduce the heat flow through them.

In order to check the possibility of such a systematic error, we introduced a sample of H_2O into the cell and waited until we were sure it had reached its equilibrium pressure. High-purity N_2 was then added very slowly to the cell with the gases being mixed constantly. The dew-point was measured at various pressures up to 10 atm. We repeated this procedure two or three times and did not detect any difference in the dew-point reading as the pressure was increased. Thus it seems safe to assume that our dew-point readings were not dependent on P .

In a previous model of our dew-point apparatus, there was a thin disk of germanium between the thermocouple and the surface on which the condensation occurred. With this unit there was apparently sufficient heat flow through the germanium with the cell at high pressures that the dew-point reading changed with increasing pressure. For this reason, this first model was modified. The germanium disk was originally tried because it could be polished to provide a very smooth surface which scattered very little light onto the photocell unless a film of H_2O was present. Germanium was used instead of glass or some other substance which could be highly polished because of its high conductivity. The copper alloy surface scatters more light but the contrast in light between dry and wet is still good.

When possible, p was maintained between approximately 4 and 12 torr when operating near room temperature. The lower limit was determined by the smallest value at which dew-point readings could give accurate measurements of p . Values of p greater than about 12 or 15 torr were avoided in order to eliminate the possibility of condensation if some of the H_2O were crowded to one portion of the absorption cell as the N_2 was being added. If this occurred and the vapor pressure of H_2O were exceeded, part of the H_2O might condense on the walls of the cell, and considerable time would be required before it evaporated and equilibrium was obtained. The absorber thickness was varied by changing the number of passes of the light through the cell.

Values of u are probably accurate to better than ± 4 or 5% for most of the samples included in this investigation. In general, the greater the value of p the better the accuracy.

2.2 TEST FOR EFFECT OF H_2O ADSORBED ON SURFACES OF MIRRORS

From the above discussion, we can calculate that the amount of H_2O adsorbed on the walls of the large absorption cell corresponds to a thickness of approximately 1 micron of liquid when the cell contains 10 torr of H_2O vapor. Since this much is adsorbed on the walls, we might expect some to be adsorbed on the surface of the mirrors in the multiple-pass optics. The objective of the experiment summarized here was to determine if any systematic errors in the absorption measurements might arise from absorption by H_2O adsorbed on the mirrors.

Since the mirror surfaces are much smoother than the walls of the cell, we would expect the surface density of H_2O to be considerably less on the mirrors, but even very small amounts might cause considerable error in some spectral regions, depending upon the absorption characteristics of the film of adsorbed H_2O . For example, if the film absorbed radiation as if it were liquid water, a layer 1 micron thick would reduce the intensity at 3 microns by about one-half.⁵ If the film behaved as a gas, its effect would be much less obvious since the absorption coefficient of vapor is less.

We assembled an optical system inside of a tank which could be evacuated and filled with H_2O or air to any desired pressure as long as the vapor pressure of H_2O was not exceeded. Light from a Nernst glower was directed through one of two optical paths within the absorption cell, out through a window and was focused on the entrance slit of a small grating spectrometer mounted in a vacuum tank. In one of the alternate paths, which we will call path A, the radiation traversed the cell with a path length of approximately 2-1/2 meters through the sample. Path A contained four reflecting surfaces from front surface aluminized mirrors. Path B had exactly the same path length through the vapor; but there were

40 mirror reflections in this path. It was possible to change from one light path to the other in a few seconds by rotating one of the mirrors with a screw assembly which was turned from outside the tank by a rotating seal.

Since the distance traversed through the vapor was exactly the same for both paths, any difference in the spectra would be due to the effect of the 36 extra reflections in path B compared to that in path A. Background curves were obtained through both paths with the cell evacuated so we could account for the reflection characteristics of "dry" mirrors.

Spectra of several different samples were obtained through the region from about 3100 cm^{-1} to 4000 cm^{-1} . The spectra were examined carefully in the region near 3850 cm^{-1} where there are very strong H_2O lines and near 3300 cm^{-1} where there is a maximum in the absorption coefficient of liquid H_2O .

After accounting for the difference in the backgrounds of paths A and B, we were not able to see any significant difference between two spectra obtained through the two different paths for the same gas sample. Therefore, any possible absorption by 36 films of H_2O on the mirror surfaces is much smaller than that by $2\frac{1}{2}$ meters of vapor. Thus, it seems safe to conclude that any possible absorption due to H_2O adsorbed on the surfaces of the mirrors of a multiple-pass cell is negligible if the distance the radiation travels through the gas is as great as 6 or 7 cm per reflection from each mirror surface. It is quite possible that the minimum distance per reflection is considerably less. Of course, it should be recalled that these measurements were obtained at room temperature; and it is possible that there is a significant effect at lower temperatures since adsorption is known to increase with decreasing temperature.

Of course, this result has application in other optical systems besides multiple-pass absorption cells. It applies to any optical system in which mirror surfaces are exposed to air.

2.3 RECORDING AND CALIBRATION OF SPECTRA

The spectra were obtained with an Ebert-type spectrometer whose main mirror has a 75 cm focal length. It utilized a small grating having a ruled area $64 \times 64\text{ mm}$ with 300 lines/mm and blazed at 3.2 microns. The grating was used in the first order and a Ge filter eliminated overlapping orders of wavelengths less than $1.8\text{ }\mu$. Thus, this system was limited to $\lambda < 3.6\text{ }\mu$ ($\nu > 2800\text{ cm}^{-1}$), since second order radiation of $\lambda > 1.8\text{ }\mu$ would be present when operating at longer wavelengths. A Nernst glower was used as a radiation source, and a PbS cell cooled with liquid nitrogen served as the detector.

The spectrometer is "home made" and was contained in a tank which could be evacuated to essentially eliminate absorption due to atmospheric gases outside the absorption cell. The spectrometer tank, as well as another vacuum tank containing the radiation source and chopper, were connected to the absorption cell by means of flexible bellows.

Approximately the same resolution schedule was used in recording all the spectra: the approximate spectral slitwidths at five different wavenumbers are given in Table 2-1.

TABLE 2-1
SPECTRAL SLITWIDTHS

Wavenumber (cm^{-1})	Spectral Slitwidth (cm^{-1})
2800	0.40
3200	0.46
3600	0.56
4000	0.67
4400	0.80

Background curves were obtained with the absorption cell evacuated for each number of passes for which sample spectra were scanned. The background curves were different for different numbers of passes since the reflectivity of the mirrors in the multiple-pass optics varies with wavenumber. The appropriate background curve, which represents 100 percent transmittance, was then fitted to each spectrum and traced on it. The transmittance was determined from the ratio of the deflection of the sample spectrum to that of the background curve at the same wavenumber.

Each spectrum was examined and compared with others for consistency. Small changes were occasionally made to account for "drift" or spurious deflections which were not reproducible. A few of the spectra on which there was considerable noise were scanned two or three times and a smoothed "average" spectrum was used.

The spectra of samples contained in the shorter absorption cell ($L \leq 32.9$ meters) were digitized while they were being scanned. Pairs of values, one related to transmittance and the other to wavenumber, were punched on IBM cards which served as input for a computer program used to calculate transmittance, integrated absorptance, and integrated absorption coefficient as a function of

wavenumber. Copies of portions of the program output are included in Sections 4, 5 and 6. Spectra of samples contained in the longer absorption cell ($L \geq 121$ meters) were scanned before the digitizing apparatus was obtained. They were replotted and digitized by use of the apparatus described in Appendix C of Reference 4.

The positions of most of the absorption lines observed in the present investigation have been measured or calculated previously^{1,6,7}. More than 200 of them were used for wavenumber calibration of the spectra; those used are listed in Table 2-2. The calibrated points are sufficiently close that the spectra are linear in wavenumber between them.

TABLE 2-2
CALIBRATION TABLE

Line No.	ν cm ⁻¹	Line No.	ν cm ⁻¹	Line No.	ν cm ⁻¹	Line No.	ν cm ⁻¹
380	2801.51D	413	3004.65	446	3169.58	479	3322.99
381	2809.34D	414	3010.23	447	3178.13	480	3329.66
382	2814.99D	415	3012.52	448	3185.21	481	3334.64
383	2819.48H	416	3015.56	449	3196.10	482	3336.71
384	2821.85D	417	3022.35	450	3199.73	483	3340.22
385	2830.02H	418	3025.78	451	3209.75	484	3345.96
386	2835.03D	419	3030.72	452	3214.14	485	3351.24
387	2841.54D	420	3031.74	453	3219.39	486	3357.00
388	2845.24D	421	3035.79	454	3222.02	487	3361.68
389	2850.92D	422	3048.95	455	3227.47	488	3364.31
390	2858.87D	423	3056.38	456	3229.91	489	3367.62
391	2871.46H	424	3059.93	457	3233.00	490	3370.98
392	2879.82H	425	3064.40	458	3236.67	491	3374.69
393	2890.15H	426	3067.01	459	3240.09	492	3380.41
394	2893.82H	427	3077.93	460	3244.96	493	3383.07
395	2901.82H	428	3079.69	461	3254.15	494	3385.69
396	2906.72H	429	3082.60	462	3257.23	495	3392.90
397	2912.13H	430	3087.18	463	3260.44	496	3397.21
398	2930.10H	431	3093.69	464	3265.09	497	3403.49
399	2935.23	432	3096.90	465	3270.48	498	3408.83
400	2954.17	433	3101.16	466	3273.60	499	3413.09
401	2955.61	434	3103.02	467	3276.40	500	3420.49
402	2961.53	435	3107.32	468	3280.06	501	3423.24
403	2966.00	436	3109.74	469	3282.94	502	3427.93
404	2973.25	437	3114.47	470	3288.47	503	3431.06
405	2975.10	438	3115.87	471	3291.35	504	3442.52
406	2977.96	439	3118.12	472	3294.18	505	3447.25
407	2980.35	440	3121.66	473	3297.49	506	3455.79
408	2984.20	441	3126.80	474	3303.25	507	3458.70
409	2987.49	442	3133.05	475	3308.80	508	3462.70
410	2991.93	443	3142.79	476	3310.50	509	3466.87
411	2993.68	444	3151.34	477	3313.27	510	3475.01
412	2995.38	445	3167.92	478	3317.26	511	3480.71

D, H The lines marked with D and H are HDO and H₂O, respectively.
taken from Migeotte et al⁶. The remainder were obtained from
Gates et al¹.

TABLE 2-2

CALIBRATION TABLE (Cont.)

Line No.	ν cm ⁻¹	Line No.	ν cm ⁻¹	Line No.	ν cm ⁻¹	Line No.	ν cm ⁻¹
512	3482.24	545	3607.03	578	3779.50	611	3975.00
513	3488.20	546	3612.55	579	3784.56	612	3982.18
514	3491.13	547	3519.64	580	3789.33	613	3995.03
515	3495.16	548	3626.24	581	3796.43	614	4008.59
516	3496.63	549	3630.71	582	3801.43	615	4019.99
517	3501.54	550	3633.86	583	3806.91	616	4025.39
518	3503.28	551	3638.09	584	3816.07	617	4044.92
519	3504.74	552	3642.57	585	3821.79	618	4060.40
520	3509.57	553	3649.27	586	3826.74	619	4073.87
521	3511.59	554	3652.93	587	3831.67	620	4079.42
522	3517.40	555	3656.35	588	3835.02	621	4088.16
523	3518.99	556	3659.94	589	3837.85	622	4106.04
524	3522.73	557	3668.79	590	3843.78	623	4133.70
525	3525.60	558	3674.97	591	3852.07	624	4138.79
526	3527.05	559	3679.44	592	3857.28	625	4149.49
527	3529.07	560	3684.55	593	3861.80	626	4159.25
528	3530.75	561	3688.45	594	3865.12	627	4172.36
529	3536.24	562	3696.34	595	3870.12	628	4181.44
530	3542.90	563	3701.75	596	3874.42	629	4191.32
531	3543.63	564	3703.42	597	3880.20	630	4204.77
532	3545.21	565	3712.20	598	3885.68	631	4216.44
533	3548.34	566	3718.97	599	3891.32	632	4230.15
534	3552.21	567	3722.19	600	3901.91	633	4239.95
535	3557.14	568	3726.62	601	3906.05	634	4250.91
536	3560.14	569	3732.13	602	3917.23	635	4264.36
537	3563.61	570	3736.69	603	3920.06	636	4275.56
538	3570.50	571	3741.06	604	3925.26	637	4294.58
539	3574.47	572	3747.41	605	3930.60	638	4306.69
540	3579.33	573	3752.21	606	3934.09	639	4329.75
541	3583.60	574	3756.61	607	3942.70	640	4356.13
542	3588.75	575	3759.79	608	3950.00	641	4407.50
543	3595.35	576	3765.79	609	3956.85	642	4493.93
544	3600.98	577	3769.80	610	3969.14	643	4512.54

SECTION 3

SHAPES OF SELF-BROADENED AND N_2 -BROADENED ABSORPTION LINES

The absorption coefficient $k(\nu)$ of a single absorption line is given by

$$k(\nu) = S f(\nu), \quad (3-1)$$

where S is the strength of the line and is constant at a given temperature. The shape function $f(\nu)$ is normalized so that

$$\int_0^{\infty} f(\nu) d\nu = 1. \quad (3-2)$$

For a Lorentz line,

$$f_L(\nu) = \frac{1}{\pi} \frac{\alpha}{(\nu - \nu_0)^2 + \alpha^2}, \text{ or} \quad (3-3)$$
$$k_L(\nu) = \frac{S}{\pi} \frac{\alpha}{(\nu - \nu_0)^2 + \alpha^2}.$$

α is the half-width and ν_0 is the line center.

At temperatures and pressures usually encountered in studies of atmospheric transmission, the shapes of absorption lines are determined by collision broadening, or pressure broadening, whichever term is preferred. Only at pressures less than a few hundredths of an atm, or at elevated temperatures, is Doppler broadening important. A wide variety of absorption data obtained under quite different conditions and at different wavenumbers indicate that the shape of collision-broadened lines is given approximately, but not exactly, by the Lorentz equation for $\nu - \nu_0$ less than a few cm^{-1} .

It is not possible to determine directly the true shape of infrared absorption lines because of the finite slitwidth of spectrometers used in making the measurements. The half-width of an absorption line at STP is of the order of 0.1 cm^{-1} , which is approximately the same as the best resolution obtainable. The modification of a spectrum due to the spectral slitwidth is greatest near the line center where $k(\nu)$ changes fastest, and the information obtainable from measurements farther from the line centers is limited by overlapping of adjacent lines. For a very good discussion of line shape measurement and the method for accounting for spectrometer slitwidth, the reader is referred to an article by Benedict, Herman, Moore and Silverman.⁸

In the microwave region, very good resolution is possible and direct measurements of line shape can be made. However, there are only limited data available and their applicability to the infrared is doubtful. Microwave studies have shown that line width is proportional to the pressure of a gas of constant composition and that $k(\nu_0)$, the absorption coefficient at the line center, is inversely proportional to pressure as predicted by the Lorentz equation.

The curve of growth of a single infrared absorption line is usually a function of the shape within 1 or 2 cm^{-1} of the center. Such curves show a dependence on pressure and absorber thickness which is similar to that expected for the Lorentz shape; but they, of course, do not prove that the lines are exactly Lorentzian. Measurements a few cm^{-1} from the line centers of various gases indicate deviations from this shape; some are stronger (super-Lorentzian) and some weaker (sub-Lorentzian). Results of two investigations, one by Winters, Silverman and Benedict⁹ and one by us,¹⁰ indicate that the extreme wings of CO_2 lines, 10-200 cm^{-1} from the centers, may be sub-Lorentzian by as much as a factor of 10 to 1000.

On the basis of the information on line shapes summarized above, it seems logical to express the shape by the Lorentz equation times a correction function F , as follows:

$$f(\nu) = f_L(\nu) F = \frac{1}{\pi} \frac{\alpha F}{(\nu - \nu_0)^2 + \alpha^2} \quad (3-4)$$

Certain characteristics of F might be expected for H_2O lines since they occur for other gases. From curve of growth data, we expect that $F \approx 1$ for $\nu - \nu_0$ less than 1 or 2 cm^{-1} ; but the measurements in the extreme wings indicate that $F \ll 1$ for very large $\nu - \nu_0$, at least for CO_2 . The CO_2 absorption coefficient was found^{9,10} to be proportional to pressure in the extreme wings; thus, if we assume α is proportional to pressure, F must be independent of α for $\nu - \nu_0 \gg \alpha$. However, our results¹⁰ tend to show that F is a function of α as well as $\nu - \nu_0$ when $\nu - \nu_0$ is the same order of magnitude as α .

The expression for the half-width of a collision-broadened line as given by kinetic theory is

$$\alpha = \frac{1}{4\pi} \sum_L N_L (D_{aL})^2 \left[2\pi k\theta \left(\frac{1}{m_a} + \frac{1}{m_L} \right) \right]^{1/2}, \quad (3-5)$$

where N_L is the number of molecules of the L th type per unit volume, D_{aL} is the sum of the optical collision diameters of the absorbing molecule and a molecule of the L th type, m_a is the mass of the absorbing molecule and m_L is the mass of the molecule of the L th type. θ is the temperature and k is Boltzmann's constant.

For a sample of $H_2O + N_2$ at constant temperature, α can be expressed by an equation of the following form,

$$\alpha = C_a p + C_{N_2} p_{N_2}. \quad (3-6)$$

Pressures of H_2O and N_2 are denoted by p and p_{N_2} , respectively; C_a and C_{N_2} are constants.

In the earth's atmosphere, most of the broadening of H_2O lines arises from collisions with N_2 , which constitutes approximately 80% of the air. It is, therefore, desirable to relate α of a mixture to an equivalent pressure P_e defined so that $P_e \rightarrow p_{N_2}$ for a very dilute mixture ($p \ll p_{N_2}$). Thus

$$\alpha = C_{N_2} P_e. \quad (3-7)$$

P_e for an $H_2O + N_2$ mixture is then given by

$$P_e = Bp + p_{N_2} = P + (B-1)p, \quad (3-8)$$

where P is the total pressure and the self-broadening coefficient $B = C_a/C_{N_2}$, the ratio of the self-broadening ability to the N_2 broadening ability.

The purpose of the investigation described in this section was to determine a reliable value of B , or a function relating B to other experimental parameters, and to see if the correction function F for self-broadened lines is significantly different from that for N_2 -broadened lines.

A typical set of measurements were carried out as follows:

A spectrum was scanned through the region from approximately 3842-3860 cm^{-1} for a sample of pure H_2O at a pressure of 15.4 torr and a path length of 416 cm. A tracing of this spectrum

is shown as Curve A1 in Figure 3-1. The multiple-pass cell was then evacuated and adjusted for a path length of 1648 cm; H₂O vapor was then added to a partial pressure of 3.9 torr, giving the same value of u as in the Sample A1. A spectrum of the pure H₂O at a pressure of 3.9 torr would, of course, show considerably less absorption than that of Sample A1 because of the lower pressure. N₂ was added to the sample and spectra were scanned at total pressures of 40, 60 and 71 torr. Only the portions of these spectra near the maxima and minima of absorptance are shown since the small separation between them and A1 is difficult to illustrate in the other regions. The increase in absorptance with increasing pressure is noted. Although neither A2, A3 or A4 is exactly coincident with A1, they are sufficiently close that we can interpolate or extrapolate to determine the total pressure which would be required of the H₂O + N₂ mixture to match spectrum A1 at any given wavenumber. We define this to be the matching pressure.

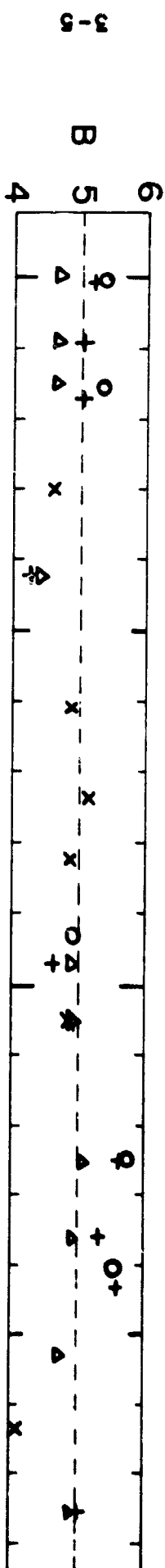
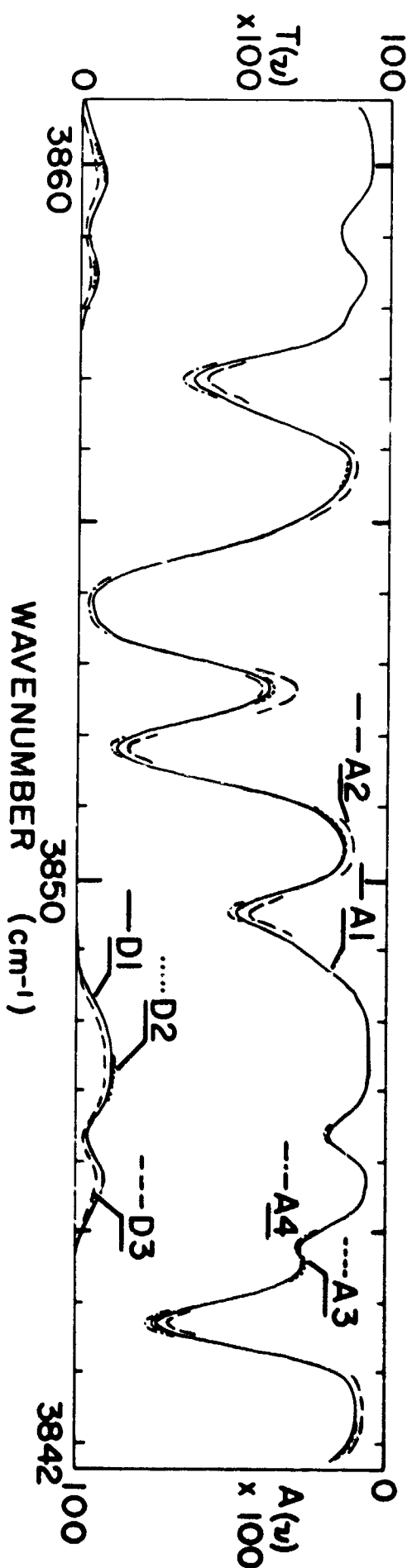
We see from A2, A3 and A4 that the absorptance increases with increasing pressure at the line centers near 3844, 3850, 3852 and 3857 cm⁻¹. At first, this may seem to be opposite of what we would expect on the basis of Equation(3-3) where f_L decreases with increasing α at $\nu = \nu_0$. The increase in $A(\nu)$ which we observe is a result of the finite slitwidth of the spectrometer which averages over a small interval. Although $k(\nu)$ decreases with increasing α for $\nu - \nu_0 < \alpha$, it increases for $\nu - \nu_0 > \alpha$. When the slitwidth of the spectrometer is a few times greater than α , the increase in $k(\nu)$ for $\nu - \nu_0 > \alpha$ causes $A(\nu)$ to increase more than the decrease in $k(\nu)$ for smaller $\nu - \nu_0$ causes it to decrease. The net result is that $A(\nu)$ increases with increasing α . When the spectral slitwidth is less than α , or when $A(\nu)$ is small, the expected decrease in $A(\nu)$ with increasing pressure can be observed.

The absorptance observed with a spectrometer having slit function \mathcal{S} is a function of \mathcal{S} , u and $f(\nu)$. \mathcal{S} and u are the same for A1 to A4; therefore, any difference in the spectra is due to a difference in $f(\nu)$. At the absorptance maximum near 3857 cm⁻¹, A3 is essentially coincident with A1; thus, we conclude that $f(\nu)$, or at least its average over the narrow region of coincidence, is the same for the corresponding samples. Now, if we assume that the central portion of this line has the Lorentz shape ($F = 1$), we conclude that the half-width of this line, and thus P_e , is the same for A1 as for A3. By substituting the pressures in the two samples in Equation(3-8) we arrive at

$$B_{15.4} = B_{3.9} + (60 - 3.9),$$

(3-8a)

$$\text{or } B = 4.9.$$



Sample	μ	P (Torr)	P (Torr)	Temp. $^{\circ}\text{K}$	Symbol
A1	6.27×10^{-3}	15.4	15.4	296	
A2	"	3.9	40	"	
A3	"	3.9	60	"	X
A4	"	3.9	71	"	
D1	7.25×10^{-2}	102	102	337	
D2	"	25.8	450	"	O
D3	"	25.8	550	"	

FIG. 3-1

SPECTRA SHOWING COMPARISON OF SELF-BROADENED AND N_2 -BROADENED H_2O LINES.

The lower portion shows calculated values of the self-broadening coefficient B.

It is apparent from the spectra that the matching pressure varies from one wavenumber to another; thus a matching of $f(\nu)$ at one wavenumber does not correspond to matching at another. Since we do not know values of α , we cannot determine if the failure to match at the same pressures is a result of different α 's or different F 's, or both. At any wavenumber, we can find a matching pressure, which means that P_e is the same for both samples at that wavenumber. We can then find a value of B by substituting the pressures in Equation (3-8). This value of B is not simply a ratio of half-widths as given in the simplified derivation of Equation (3-8), but it may also include differences in the correction function F .

B was calculated at several different wavenumbers from spectra A1 to A4; the calculated values are represented in the lower portion of the figure by the x's. Most of the absorption in the regions of minimum absorptance is due to the wings of the neighboring lines and is so small for the Samples A1 to A4 that reliable values of B could not be determined. Therefore, spectra D1, D2 and D3 were obtained for samples having considerably larger p and u . The temperature was increased to permit the usage of larger p without condensation. The values of B calculated from these spectra are indicated by o's at four different wavenumbers in the lower portion of the figure. The other symbols represent two other sets of samples of intermediate u and p . We see that all of the calculated values of B occur between 4 and 6, with most of them between 4.5 and 5.5. At any given wavenumber, there is less than $\pm 10\%$ difference in the values; this much could be attributed to experimental error.

If, as an example, F were the same near the line centers for self-broadened lines as for N_2 -broadened lines but was greater in the wings of self-broadened lines, B would be greater in the regions between lines than near the centers. No correlation is apparent between the values of B and locations of the points relative to line centers, indicating that there is certainly not a great difference between a self-broadened line and an N_2 -broadened line between about 0.2 and 2 cm^{-1} from the centers. We will see below that this is not the case for CO_2 lines.

These data provide essentially no information about the relative shapes for $\nu - \nu_0$ greater than approximately 2 cm^{-1} since nearly all the absorption at any point in the interval shown is due to lines whose centers are within this distance. Also, we cannot learn much about the region within 0.2 or 0.3 cm^{-1} from the center because of the averaging by the finite slitwidth.

It is important to consider some of the possible sources of error in these measurements. Besides the usual problems of noise, placement of the background curve, etc., the results are subject to systematic errors if the absorber thickness u is not the same in both samples being compared. For example, if u in Samples A2, A3 and A4 were slightly less than that in

Sample A1, the matching pressure would be increased. Furthermore, the matching pressure would be different at different wavenumbers, even if the shapes $f(\nu)$ were the same for both types of lines, since increasing the pressure has a different effect in the wings of the lines than near the centers. For example, a two percent error in u would probably result in only a 3 or 4% error in B at a point where most of the absorption is due to the wings of lines. This is true because $k(\nu)$ is proportional to pressure in the wings, causing the absorptance to be equally dependent on u and P_e . However, under many conditions, the absorptance observed near the center of the line is more strongly dependent on u than on P_e ; in fact, as pointed out above, the absorptance might even decrease with increasing P_e . Therefore, a two percent error in matching u could result in a considerably larger error in the value of B near the line center.

We also obtained spectra over two other short intervals at slightly higher wavenumbers. The calculated values of B also occurred between 4 and 6 with no apparent correlation with distance from line centers.

Two similar sets of measurements were also made with He as the broadening gas instead of N_2 . The broadening ability of He was found to be only about $1/5$ to $1/4$ as great as that of N_2 and, again, there was no correlation between broadening ability and distance from the nearest line centers. Helium was chosen since we have found in another investigation¹⁰ that the distant wings of He-broadened CO_2 lines are much weaker than self-broadened lines having the same half-width. Thus, it seemed appropriate to see if such a phenomenon also existed for He-broadened H_2O lines. Of course, the present results do not provide any information about the relative shapes for $\nu - \nu_0$ greater than about 2 cm^{-1} ; but they do indicate that there is not an appreciable difference between He-broadened and self-broadened H_2O lines for smaller $\nu - \nu_0$.

Our results do not rule out the possibility of small variations in B from one line to another; in fact, there are indications of small variations. But, because of the uncertainties in the measurements, differences of only a few percent cannot be observed. However, in the spectral regions covered any possible differences in B between lines is probably less than $\pm 20\%$.

It is interesting to compare the results shown in Figure 3-1 with those of a similar set of measurements of CO_2 absorption shown in Figure 3-2. Since the problem of adsorption by CO_2 on the walls of the absorption cell is much less serious than for H_2O , it is possible to measure CO_2 samples more accurately; thus, the reproducibility of the data is better. We see from Figure 3-2 that there is a definite correlation between the matching pressure and the positions relative to the centers of the absorption lines. We obtain a matching pressure of 46 torr, which corresponds to $B \approx 1.2$ near the line centers; but this increases to approximately 1.3 in the regions midway between the lines which are only approximately

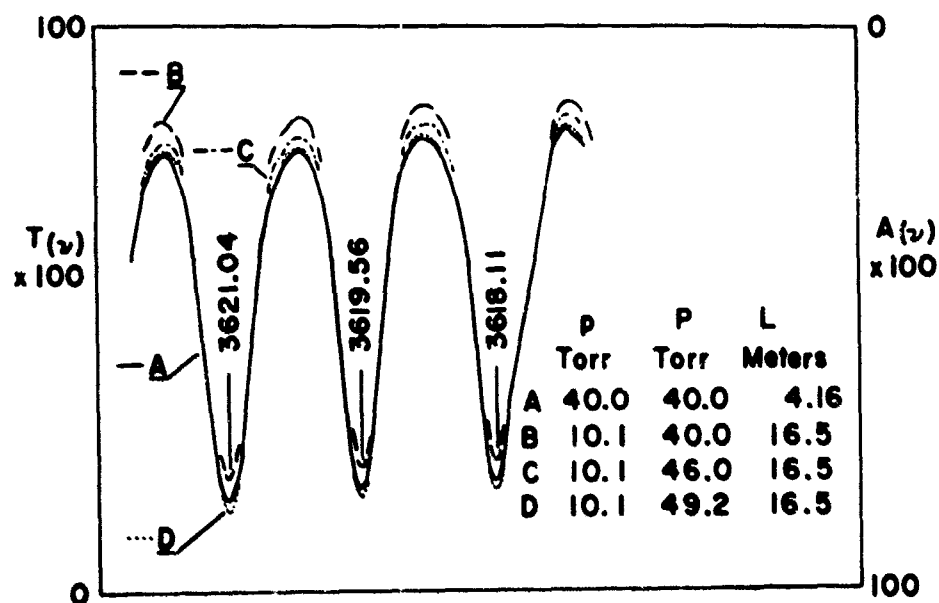


FIG. 3-2 SPECTRA SHOWING COMPARISON OF SELF-BROADENED AND N₂-BROADENED CO₂ LINES.

The pressure of the CO₂ - N₂ mixture that is required to match the pure CO₂ sample is seen to be greater between the lines than near the line centers. Such a correlation between matching pressure and distance from the line centers was not observed for H₂O lines in Fig. 3-1.

0.7 cm^{-1} away. The spectral region shown in Figure 3-2 was chosen because it is relatively free of weaker CO_2 lines arising from transitions from excited states. Therefore, most of the absorption at the points midway between the lines which are apparent is actually due to the wings of the stronger lines and not due to much weaker lines not resolved in the spectra. Similar differences between B near the line centers and in the wings has also been observed with larger samples and in other parts of the spectrum, including the $3\nu_3$ band near 1.4μ .

On the basis of the results shown in Figure 3-2 we conclude that, unlike H_2O lines, there is a significant difference in the shapes of self-broadened and N_2 -broadened CO_2 lines as close in as a few tenths of a cm^{-1} from the line centers. We cannot conclude whether either of these lines has the Lorentz shape, but it is certain that both do not.

A few years ago we¹¹ carried out a similar set of measurements in order to determine self-broadening coefficients for CO_2 and H_2O . These measurements were made with considerably lower resolution so that it was not possible to observe the regions between individual absorption lines. Therefore, the values of B represented averages over several lines. They appeared to depend somewhat on the position within a band and to a lesser extent upon the pressure and absorber thickness used in the measurements. The values for CO_2 varied between approximately 1.2 and 1.4; so we used 1.3 as an average in the analysis of the data. These results are consistent with the present ones, since in the earlier measurements made with lower resolution, the samples were chosen to provide absorptance sufficiently large that it could be measured with good accuracy. Therefore, regions near the line centers were probably opaque and all of the growth caused by increasing the pressure occurred in the regions between the lines; the effective value of B would then be that corresponding to the wings of the lines.

In regions between lines which are farther apart, it is possible that B would be larger than 1.3, and even as large as 1.4. Similarly, an effective value as small as 1.2 might be appropriate for regions where the lines are close together. It is also possible that there is a small dependence of B on J-value; but the consistency of our results indicates the variation is not more than a few percent.

In the earlier work, we also obtained an effective value of $B = 5$ for H_2O self-broadening for the bands near the 1.9 and 2.7μ from measurements made with lower resolution. This result is also in good agreement with those shown in Figure 3-1.

Palmer¹² has published some H_2O data which provide information about self-broadening and N_2 -broadening in the $200\text{--}600 \text{ cm}^{-1}$ region. Palmer's spectra were obtained with a spectral slitwidth between 4 and 10 cm^{-1} , which is sufficiently wide to include several absorption lines. Benedict¹²

suggested an empirical equation based on Palmer's data which relates an effective self-broadening coefficient to the transmittance $T(\nu)$. Written in our notation, it becomes

$$B = 11 - 5 T(\nu) = 6 + 5 A(\nu). \quad (3-9)$$

The need for an equation relating B to $T(\nu)$ was attributed to differences in the shapes of self-broadened and N_2 -broadened lines; the relative strengths of the wings of the self-broadened lines being greater. When $A(\nu)$ is small, most of the absorption occurs near the line centers; but as $A(\nu)$ approaches unity, the regions near the line centers are opaque and most of the growth occurs in the wings. Therefore, the value of B used for small absorptance should correspond to that near the centers of individual lines, and the value used for large absorptance to wings of the lines.

We see that Palmer's results are quite different from ours. The minimum value (6) of B in Equation (3-9) is larger than any observed by us. Furthermore, we could see no significant difference between the line centers and the wings; but Palmer's data indicates almost a doubling of B . It does not seem probable that such a great difference between the two sets of results could be due to experimental error. Thus, it appears that there is a greater difference between self-broadened and N_2 -broadened H_2O lines at the lower wavenumbers studied by Palmer than at higher wavenumbers.

Bignell, Sledy and Sheppard¹³ have also attempted to determine the ratio between self-broadening and N_2 -broadening in the region from approximately 800 to 1200 cm^{-1} . Their measurements were made on the absorption of radiation from the sun by H_2O in the earth's atmosphere. They accounted for the very weak H_2O lines which occur in this region and determined a continuum absorption due to the extreme wings of the very strong H_2O lines at higher and lower wavenumbers. Thus, the absorption they measured was due to the extreme wings, and their results would not necessarily be expected to agree with ours. They found that the self-broadening of H_2O in this region was probably as much as 30 times that of N_2 -broadening. Such a change in the ratio of self- to N_2 -broadening at various distances from the centers of the lines is certainly large and may even appear to be somewhat surprising. But it does not seem too improbable in view of the fact that such great variations have been observed for CO_2 lines by us;¹⁰ these results will be published within the next several weeks.

SECTION 4

3847-3860 and 3895-3932 cm^{-1} REGIONS

4.1 DISCUSSION AND TRANSMISSION SPECTRA

This section deals with two short spectral regions, 3847-3860 cm^{-1} and 3895-3932 cm^{-1} . Copies of the spectra are shown in Figures 4-1 through 4-6; the numbers enclosed in rectangles refer to the numbers assigned to the samples whose parameters are shown in Table 4-1. The numbers shown in the second panel from the top of Figure 4-2 refer to calibration lines whose wavenumbers are given in Table 2-2. The wavenumbers of these lines as well as many others not resolved in the spectra have been tabulated by Gates et al.¹

Spectra of the two different spectral regions are shown in separate panels in Figure 4-1 through 4-4 for Samples 1 to 16 which were contained in the shorter absorption cell. Samples 17 to 29 were contained in the longer absorption cell; the spectra of these samples are shown in Figures 4-5 and 4-6, where both regions are contained within the same panel. The spectra in the latter two figures were replotted by the technique described in Appendix C of Reference 4 and appear on a scale quite different from that used in the first four figures. Spectra of Samples 23, 26, 27, 28, and 29 are not shown for the 3847-3860 cm^{-1} region since the absorbance is nearly complete at all wavenumbers within this interval.

The two short spectral regions described in this section were studied in considerable detail since they are useful in interpreting spectra of paths through the atmosphere. The 3847-3860 cm^{-1} region contains some very strong lines and is particularly useful for comparison with spectra of relatively small samples of H_2O . As an example, it is useful for interpreting solar spectra obtained from a high altitude balloon or

aircraft where the radiation has passed through only a small amount of H_2O . The other spectral region contains several lines which are much weaker, making it useful for a comparison with samples containing more H_2O , such as the path between the sun and an aircraft or balloon at lower altitudes. Spectra of the $3895\text{-}3932\text{ cm}^{-1}$ region can also be useful in placing the curve corresponding to zero absorptance on a solar spectra. By comparing a solar spectrum with one of the laboratory spectra having approximately the same integrated absorptance over a group of lines such as those between 3895 and 3908 cm^{-1} , the average absorptance over the adjacent window from 3908 to 3916 cm^{-1} could be estimated. The average absorptance observed over the window is essentially independent of spectrometer slitwidth provided it is less than about 5 cm^{-1} . Of course, the ratio of the integrated absorptance over the window region to that over the cluster of lines is not constant but depends on the pressure and absorber thickness. But a reasonable estimate of the integrated absorptance, and thus the average absorptance, over the window region can be obtained by such comparison; and since it is small for many samples, the curve corresponding to zero absorptance can be located on a solar spectrum with reasonable accuracy.

4.2 TABLES OF TRANSMITTANCE AND INTEGRATED ABSORPTANCE

Table 4-2 contains values of the observed transmittance $T(\nu)$ versus wavenumber in the $3847\text{-}3860\text{ cm}^{-1}$ region. Values are tabulated at intervals of 0.2 cm^{-1} , which is sufficiently close that the original spectra could be reconstructed with little loss of structure by plotting the points and joining them with straight lines. Small errors in such a replotted spectrum would occur near the centers of some of the absorption lines; a little of the line might be "cut off," but the error introduced in the calculation of the integrated absorptance is negligible. Values of $T(\nu) > 1.0$ which appear occasionally in the transmittance tables are a result of noise on the sample spectra.

Table 4-3 consists of values of integrated absorptance $\int_{\nu'}^{\nu} A(\nu) d\nu$ versus wavenumber for the same samples over the same spectral region with values tabulated at intervals of 0.5 cm^{-1} . The lower limit of integration ν' is shown at the top of each column. The integrated absorptance between any two points within the interval can be calculated from the difference between the values tabulated at those two points. The calculations are based on spectra composed of straight lines joining points corresponding to the transmittance values given in Table 4-2.

Tables 4-4 and 4-5 are the tables of transmittance and integrated absorptance, respectively, for the $3895\text{-}3932\text{ cm}^{-1}$ region.

TABLE 4-1
SAMPLE PARAMETERS

Sam. No.	p torr	P torr	P _e [*] torr	p atm	P atm	P _e [*] atm	L Path m	u gm/cm ²
1	4.0	4.0	20	0.00526	0.00526	0.0263	2.10	0.00080
2	4.0	40.0	56	0.00526	0.0526	0.0737	2.10	0.00080
3	4.0	210	226	0.00526	0.276	0.297	2.10	0.00080
4	4.0	745	761	0.00526	0.980	1.001	2.10	0.00080
5	6.4	6.4	32	0.00842	0.00842	0.0421	4.16	0.00260
6	6.4	46.0	71.6	0.00842	0.0605	0.0942	4.16	0.00260
7	6.4	200	226	0.00842	0.263	0.297	4.16	0.00260
8	6.4	731	757	0.00842	0.962	0.996	4.16	0.00260
9	6.4	6.4	32	0.00842	0.00842	0.0421	12.4	0.00772
10	6.4	46.0	71.6	0.00842	0.0605	0.0942	12.4	0.00772
11	6.4	200	226	0.00842	0.263	0.297	12.4	0.00772
12	6.4	731	757	0.00842	0.962	0.996	12.4	0.00772
13	6.4	6.4	32	0.00842	0.00842	0.0421	32.9	0.0205
14	6.4	46.0	71.6	0.00842	0.0605	0.0942	32.9	0.0205
15	6.4	200	226	0.00842	0.263	0.297	32.9	0.0205
16	6.4	731	757	0.00842	0.962	0.996	32.9	0.0205
17	0.48	0.48	2.40	0.00063	0.00063	0.00316	469	0.0219
18	1.95	1.95	9.75	0.00256	0.00256	0.0128	237	0.0450
19	3.80	57.0	72.2	0.00500	0.0750	0.0950	121	0.0448
20	7.50	7.50	37.5	0.00987	0.00987	0.0493	121	0.0885
21	7.52	38.8	68.9	0.00989	0.0511	0.0907	121	0.0887
22	7.35	192	221	0.00967	0.253	0.291	121	0.0867
23	7.35	723	752	0.00967	0.951	0.989	121	0.0867
24	7.50	7.50	37.5	0.00987	0.00987	0.0493	469	0.343
25	7.47	36.7	68.6	0.00983	0.0509	0.0903	469	0.341
26	7.47	192	222	0.00983	0.253	0.292	469	0.341
27	7.52	7.52	37.6	0.00989	0.00989	0.0495	933	0.684
28	15.3	15.3	76.5	0.0201	0.0201	0.1006	469	0.699
29	15.3	1525	1586	0.0201	2.01	2.08	469	0.697

* $P_e = P \cdot 4p$ in accordance with Equation (3-8) and the results of Section 3.
All samples were at room temperature, 296°K.

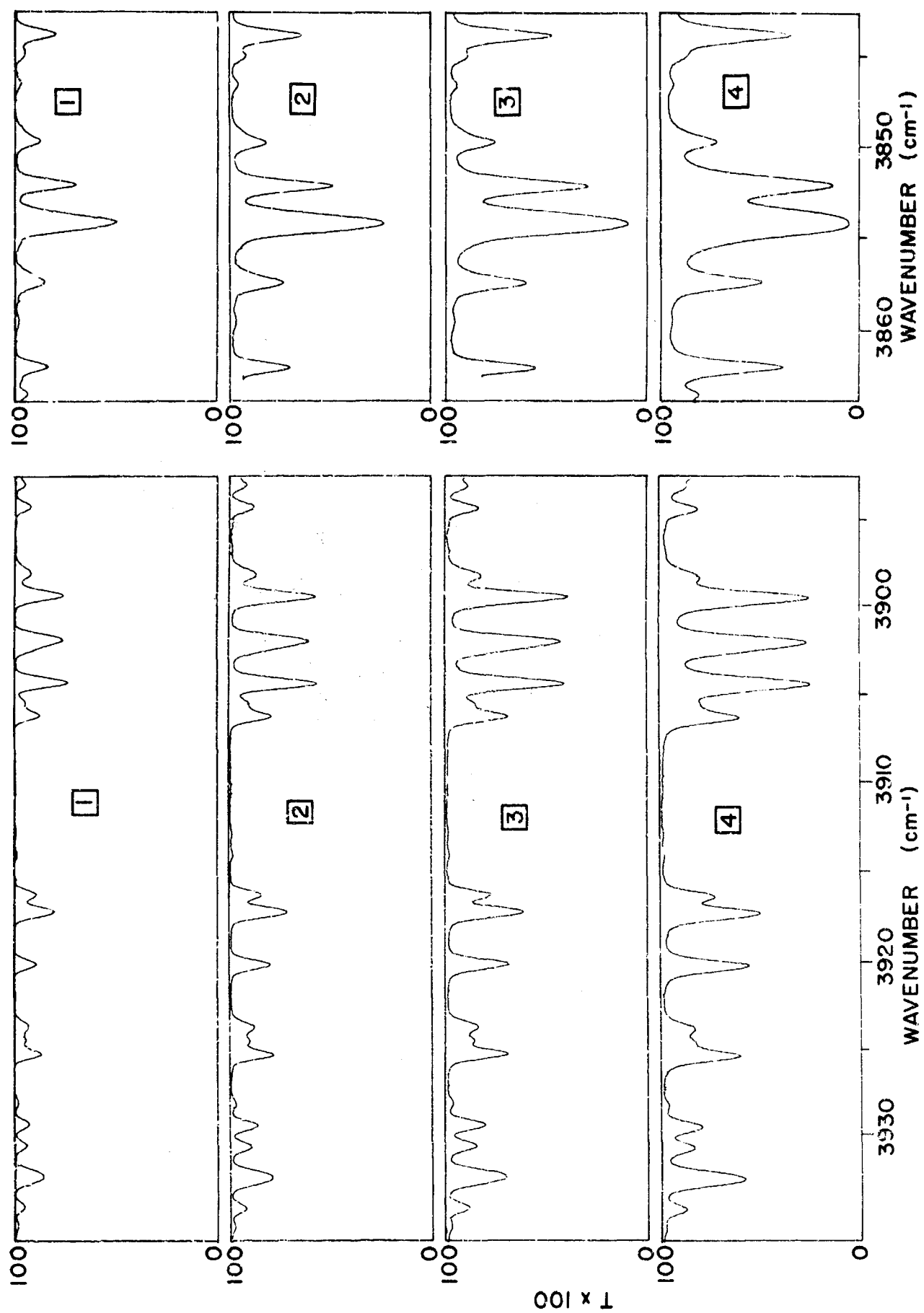
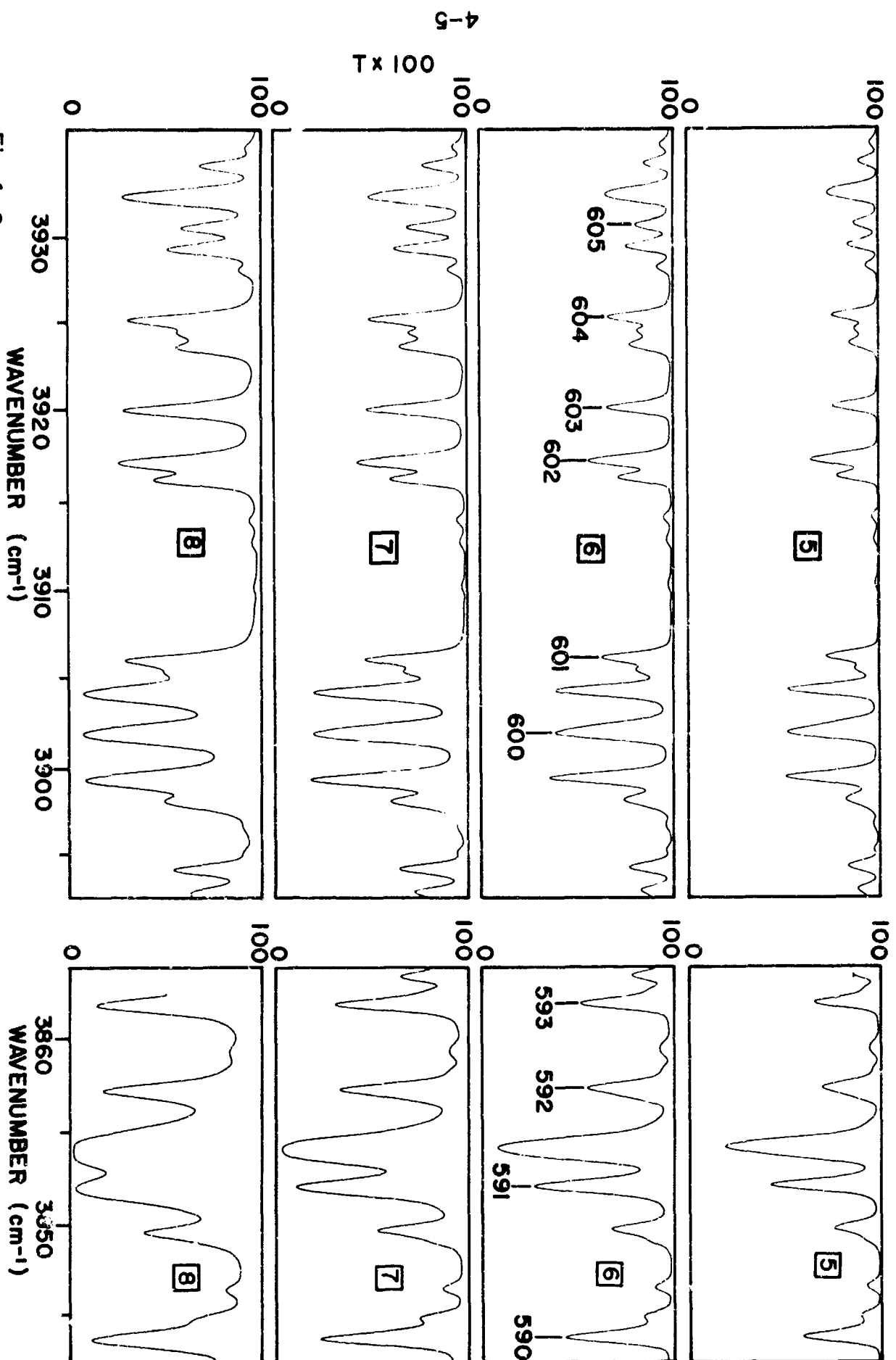


Fig. 4-1



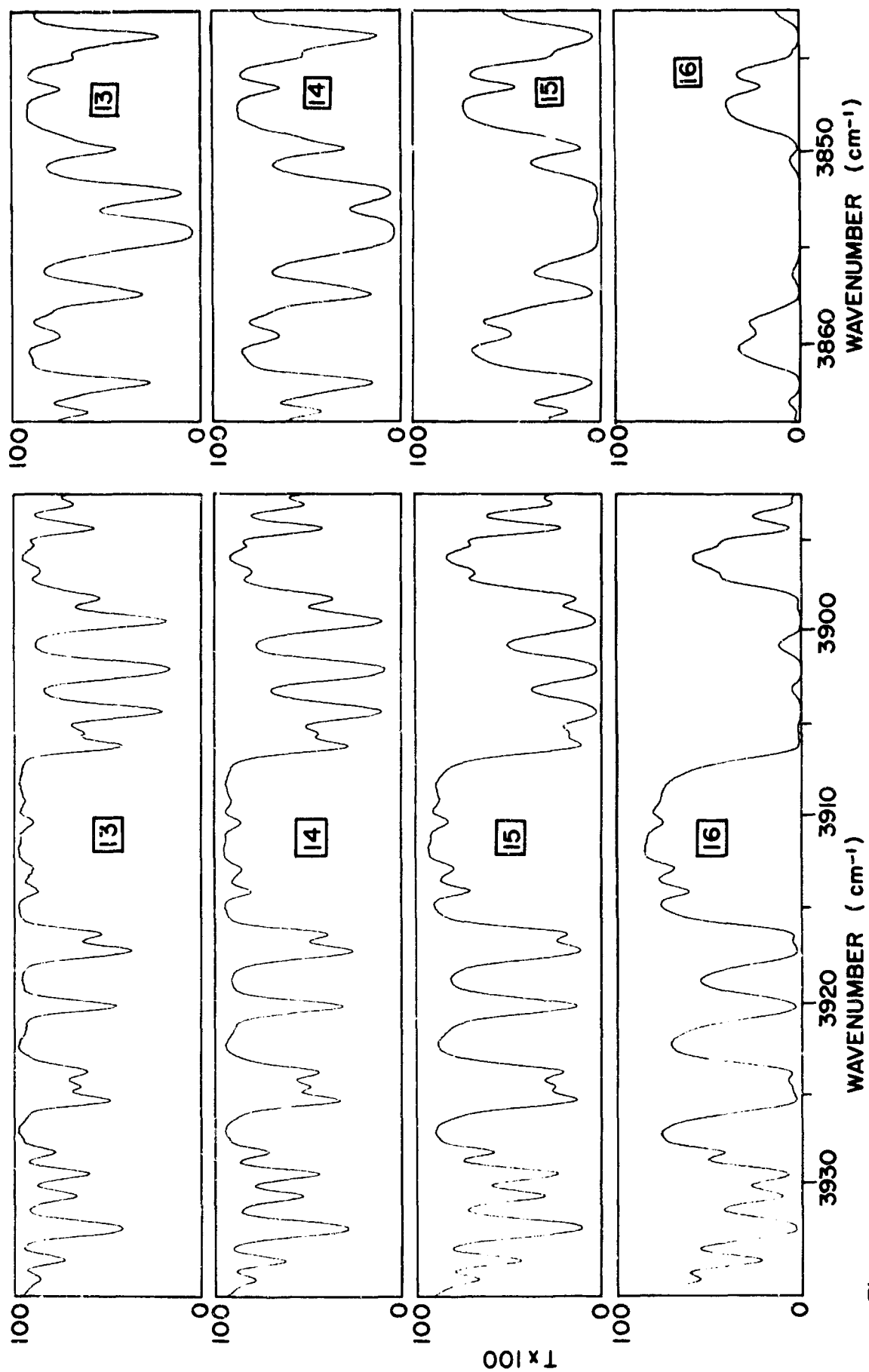


Fig. 4-4

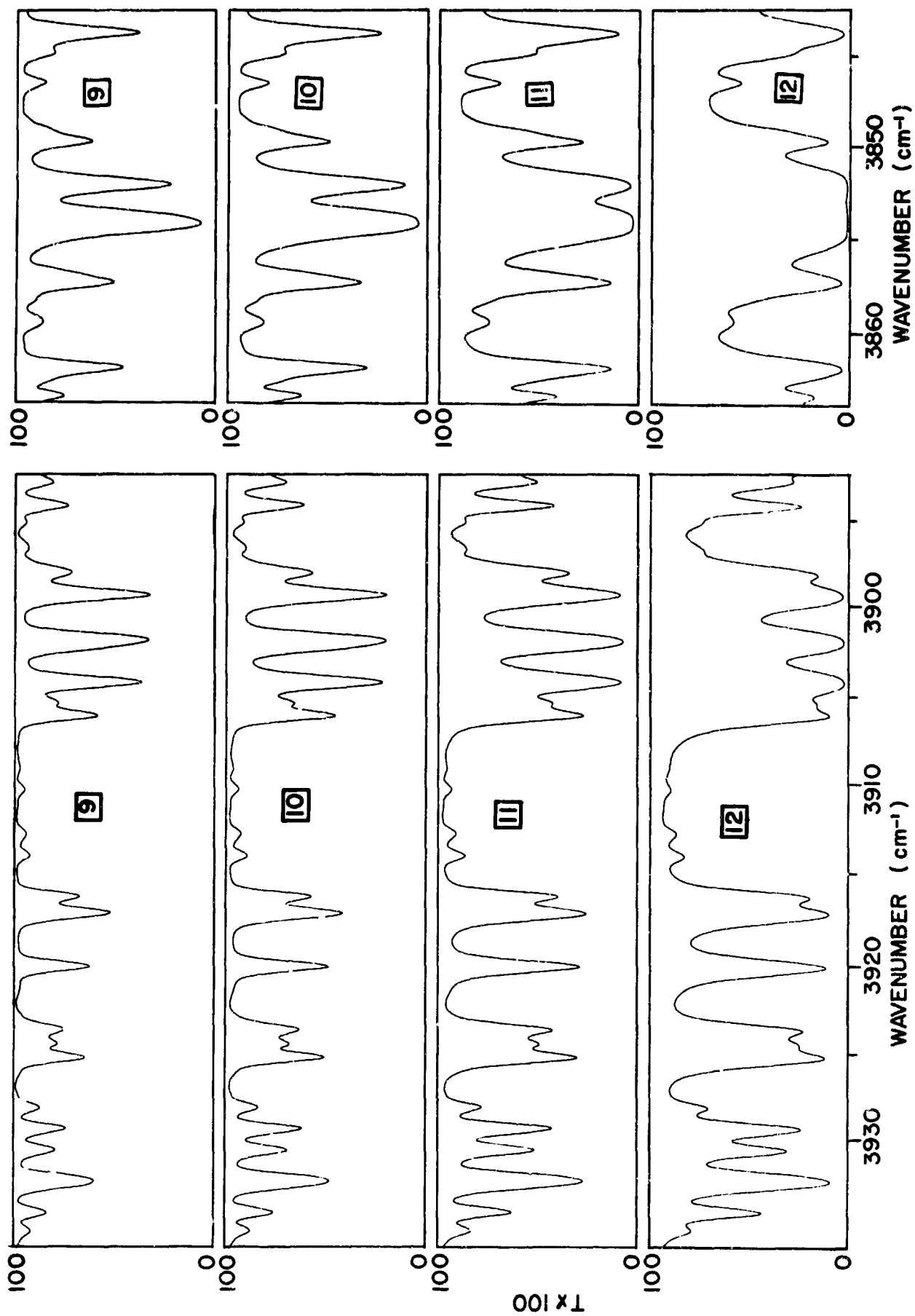


Fig. 4-3

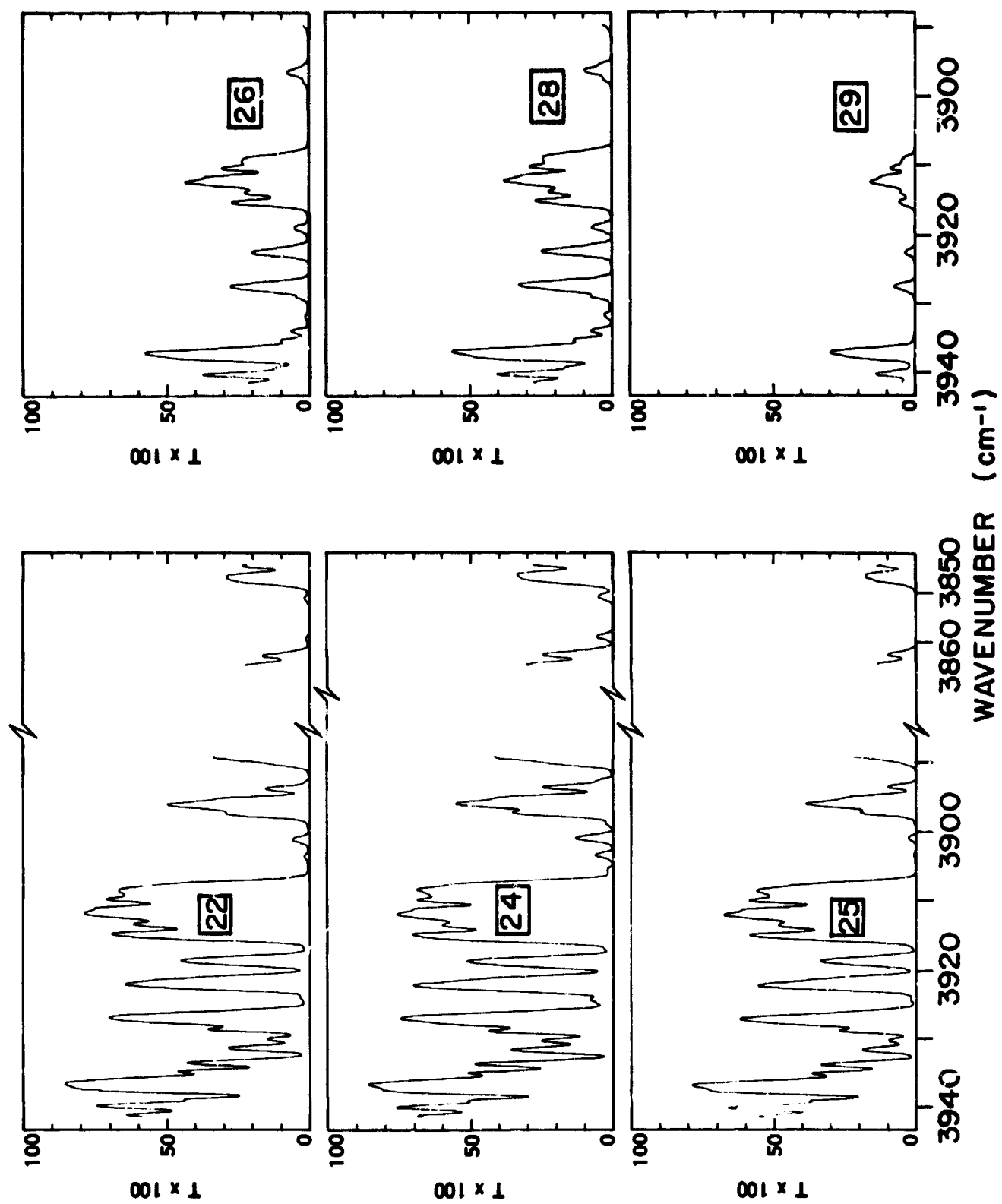


Fig. 4-6

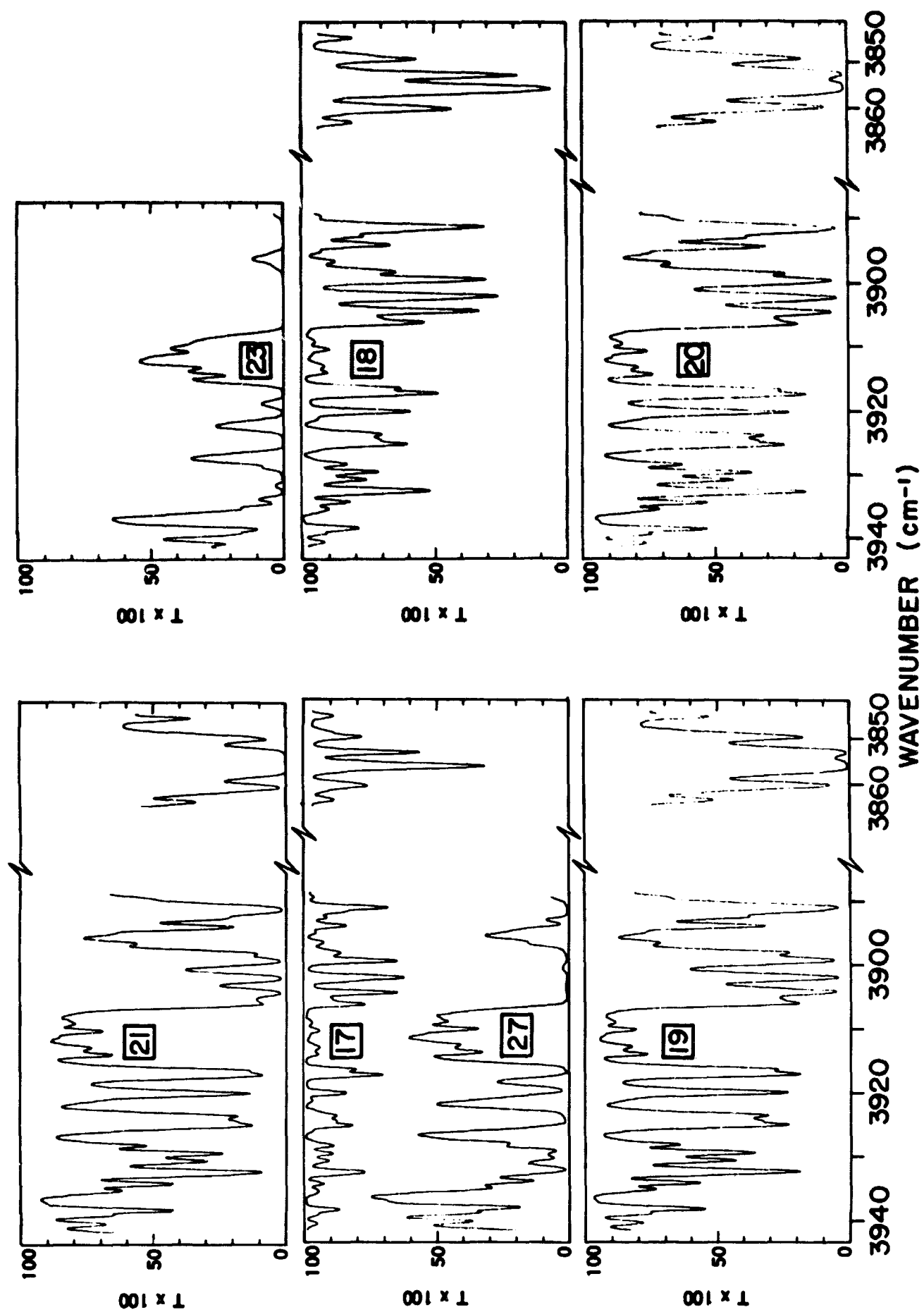


Fig. 4-5

Table 4-2

[illegible]

Table 4-3 $\int A(\nu) d\nu$

Sam. No.	1	2	3	4	5	6	7	8	9	10	11	12
$p(\text{atm})$	5.26×10^{-3}	5.26×10^{-3}	5.26×10^{-3}	5.26×10^{-3}	8.42×10^{-3}	8.42×10^{-3}	8.42×10^{-3}	8.42×10^{-3}	8.42×10^{-3}	8.42×10^{-3}	8.42×10^{-3}	8.42×10^{-3}
$P_0(\text{atm})$	2.63×10^{-2}	7.37×10^{-2}	2.97×10^{-1}	1.001×10^0	4.21×10^{-2}	9.42×10^{-2}	2.97×10^{-1}	9.96×10^{-1}	4.21×10^{-2}	9.42×10^{-2}	2.97×10^{-1}	9.96×10^{-1}
$u(\text{gm/cm}^2)$	8.0×10^{-4}	8.0×10^{-4}	8.0×10^{-4}	8.0×10^{-4}	2.60×10^{-3}	2.60×10^{-3}	2.60×10^{-3}	2.60×10^{-3}	7.72×10^{-3}	7.72×10^{-3}	7.72×10^{-3}	7.72×10^{-3}
ν (cm^{-1})	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}
3847.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3847.5	0.002	0.006	0.013	0.022	0.005	0.011	0.020	0.055	0.025	0.027	0.056	0.149
3848.0	0.003	0.015	0.025	0.042	0.010	0.021	0.038	0.113	0.051	0.053	0.112	0.301
3848.5	0.006	0.023	0.038	0.065	0.020	0.039	0.063	0.187	0.089	0.091	0.186	0.482
3849.0	0.015	0.040	0.061	0.099	0.047	0.091	0.122	0.319	0.165	0.179	0.338	0.752
3849.5	0.057	0.085	0.119	0.170	0.116	0.203	0.263	0.568	0.306	0.351	0.610	1.141
3850.0	0.104	0.164	0.225	0.297	0.218	0.322	0.460	0.825	0.466	0.560	0.922	1.559
3850.5	0.119	0.197	0.276	0.382	0.249	0.360	0.547	0.996	0.530	0.653	1.101	1.907
3851.0	0.123	0.211	0.307	0.449	0.262	0.393	0.619	1.208	0.582	0.730	1.290	2.287
3851.5	0.134	0.238	0.361	0.569	0.300	0.491	0.776	1.559	0.704	0.898	1.612	2.742
3852.0	0.217	0.360	0.545	0.852	0.482	0.779	1.133	2.022	1.022	1.267	2.067	3.229
3852.5	0.324	0.568	0.853	1.257	0.698	1.022	1.522	2.482	1.315	1.642	2.529	3.720
3853.0	0.345	0.637	0.996	1.542	0.758	1.128	1.765	2.897	1.451	1.871	2.932	4.208
3853.5	0.394	0.720	1.142	1.802	0.875	1.351	2.057	3.350	1.693	2.182	3.366	4.699
3854.0	0.567	0.981	1.483	2.212	1.189	1.761	2.504	3.834	2.118	2.638	3.849	5.191
3854.5	0.783	1.337	1.917	2.680	1.557	2.152	2.976	4.317	2.542	3.097	4.335	5.683
3855.0	0.856	1.517	2.196	3.062	1.713	2.331	3.354	4.743	2.769	3.420	4.789	6.170
3855.5	0.871	1.559	2.291	3.272	1.758	2.394	3.547	5.040	2.869	3.578	5.127	6.620
3856.0	0.876	1.578	2.332	3.374	1.776	2.426	3.643	5.240	2.921	3.657	5.340	7.003
3856.5	0.884	1.594	2.363	3.445	1.799	2.452	3.720	5.434	2.991	3.677	5.516	7.365
3857.0	0.919	1.643	2.428	3.543	1.884	2.629	3.892	5.752	3.157	3.981	5.809	7.795
3857.5	0.983	1.755	2.594	3.756	2.020	2.814	4.186	6.112	3.383	4.278	6.216	8.256
3858.0	1.012	1.821	2.705	3.913	2.080	2.885	4.339	6.291	3.492	4.429	6.503	8.607
3858.5	1.018	1.837	2.733	3.963	2.101	2.913	4.393	6.388	3.548	4.495	6.641	8.843
3859.0	1.022	1.848	2.750	3.992	2.115	2.936	4.431	6.467	3.591	4.543	6.731	9.034
3859.5	1.031	1.862	2.769	4.020	2.143	2.970	4.480	6.547	3.664	4.619	6.843	9.230
3860.0	1.035	1.873	2.786	4.046	2.162	2.992	4.517	6.617	3.717	4.676	6.942	9.405

Sam. No.	13	14	15	16	17	18	19	20	21	22	24	25
$p(\text{atm})$	8.42×10^{-3}	8.42×10^{-3}	8.42×10^{-3}	8.42×10^{-3}	6.3×10^{-4}	2.6×10^{-3}	5.0×10^{-3}	9.87×10^{-3}	9.89×10^{-3}	9.67×10^{-3}	9.87×10^{-3}	9.83×10^{-3}
$P_0(\text{atm})$	4.21×10^{-2}	9.42×10^{-2}	2.97×10^{-1}	9.96×10^{-1}	3.16×10^{-3}	1.23×10^{-2}	9.30×10^{-2}	4.93×10^{-2}	9.07×10^{-2}	2.91×10^{-1}	4.93×10^{-2}	9.03×10^{-2}
$u(\text{gm/cm}^2)$	2.05×10^{-2}	2.05×10^{-2}	2.05×10^{-2}	2.05×10^{-2}	2.19×10^{-2}	4.30×10^{-2}	4.48×10^{-2}	8.83×10^{-2}	8.87×10^{-2}	8.67×10^{-2}	3.43×10^{-1}	3.41×10^{-1}
ν (cm^{-1})	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}	$\nu' = 3847$ cm^{-1}
3847.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3847.5	0.046	0.079	0.135	0.298	0.018	0.032	0.112	0.136	0.200	0.360	0.334	0.414
3848.0	0.088	0.151	0.270	0.603	0.033	0.067	0.224	0.274	0.399	0.724	0.673	0.831
3848.5	0.148	0.235	0.444	0.946	0.055	0.112	0.385	0.453	0.637	1.124	1.046	1.270
3849.0	0.264	0.383	0.723	1.363	0.098	0.215	0.639	0.726	0.949	1.585	1.482	1.746
3849.5	0.460	0.630	1.119	1.839	0.169	0.379	0.799	1.092	1.392	2.077	1.966	2.239
3850.0	0.700	0.953	1.534	2.324	0.266	0.574	1.189	1.684	1.842	2.573	2.454	2.738
3850.5	0.822	1.171	1.861	2.795	0.310	0.675	1.686	1.769	2.243	3.067	2.930	3.238
3851.0	0.925	1.343	2.213	3.277	0.331	0.754	1.991	2.102	2.649	3.562	3.410	3.738
3851.5	1.124	1.604	2.657	3.771	0.376	0.898	2.392	2.510	3.118	4.060	3.904	4.238
3852.0	1.514	2.025	3.143	4.267	0.524	1.216	2.872	2.987	3.612	4.560	4.403	4.738
3852.5	1.910	2.488	3.633	4.764	0.694	1.588	3.363	3.473	4.110	5.060	4.903	5.238
3853.0	2.168	2.880	4.117	5.260	0.749	1.827	3.441	3.441	4.607	5.560	5.403	5.738
3853.5	2.498	3.284	4.607	5.756	0.834	2.073	4.323	4.420	5.104	6.060	5.903	6.238
3854.0	2.959	3.759	5.099	6.254	1.037	2.463	4.817	4.909	5.603	6.560	6.403	6.738
3854.5	3.423	4.244	5.592	6.751	1.358	2.929	5.312	5.399	6.101	7.060	6.903	7.238
3855.0	3.768	4.689	6.081	7.247	1.580	3.345	5.802	5.885	6.599	7.560	7.403	7.738
3855.5	3.960	5.007	6.535	7.743	1.651	3.590	6.238	6.329	7.082	8.060	7.903	8.238
3856.0	4.062	5.201	6.910	8.227	1.678	3.689	6.567	6.662	7.513	8.559	8.403	8.738
3856.5	4.180	5.382	7.239	8.705	1.703	3.766	6.854	6.948	7.903	9.054	8.899	9.238
3857.0	4.427	5.687	7.636	9.196	1.775	3.930	7.228	7.319	8.335	9.551	9.394	9.738
3857.5	4.744	6.083	8.104	9.689	1.884	4.189	7.676	7.764	8.815	10.048	9.890	10.237
3858.0	4.912	6.357	8.521	10.152	1.968	4.414	8.050	8.132	9.251	10.539	10.370	10.732
3858.5	5.001	6.508	8.810	10.555	2.008	4.507	8.354	8.434	9.555	10.994	10.752	11.208
3859.0	5.068	6.615	9.016	10.916	2.034	4.560	8.449	8.543	9.690	11.423	11.155	11.662
3859.5	5.181	6.770	9.247	11.283	2.082	4.643	8.680	8.785	10.165	11.869	11.549	12.133
3860.0	5.262	6.906	9.477	11.625	2.120	4.713	8.854	8.970	10.434	12.281	11.935	12.582

Table 4-4

[illegible]

Table 4-5 $\int_0^{\infty} A(\nu) d\nu$

Den. No	1	2	3	4	5	6	7	8	9	10	11	12	13	14
$\rho(\text{cm})$	5.26 $\times 10^{-2}$	5.26 $\times 10^{-2}$	5.26 $\times 10^{-2}$	5.26 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$	8.42 $\times 10^{-2}$
$P_0(\text{cm})$	2.63 $\times 10^{-2}$	2.63 $\times 10^{-2}$	2.63 $\times 10^{-2}$	2.63 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$	4.21 $\times 10^{-2}$
$\alpha(\text{cm}/\text{cm}^2)$	8.0 $\times 10^{-2}$	8.0 $\times 10^{-2}$	8.0 $\times 10^{-2}$	8.0 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$	2.60 $\times 10^{-2}$
ν (cm^{-1})	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}	$\nu^{\circ}3000$ cm^{-1}
3005.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3005.5	0.001	0.012	0.011	0.019	0.011	0.013	0.025	0.042	0.025	0.037	0.060	0.111	0.046	0.076
3006.0	0.000	0.021	0.019	0.033	0.016	0.020	0.041	0.079	0.036	0.060	0.113	0.196	0.074	0.127
3006.5	0.000	0.030	0.027	0.048	0.021	0.031	0.060	0.118	0.061	0.091	0.135	0.247	0.124	0.191
3007.0	0.002	0.042	0.038	0.056	0.036	0.047	0.088	0.169	0.093	0.136	0.221	0.347	0.152	0.282
3007.5	0.007	0.057	0.053	0.069	0.051	0.070	0.129	0.254	0.133	0.187	0.305	0.480	0.204	0.362
3008.0	0.030	0.097	0.090	0.107	0.109	0.140	0.292	0.446	0.234	0.327	0.512	0.757	0.432	0.586
3008.5	0.064	0.160	0.150	0.244	0.182	0.259	0.426	0.687	0.363	0.512	0.813	1.207	0.630	0.881
3009.0	0.092	0.214	0.207	0.366	0.259	0.380	0.606	0.991	0.502	0.731	1.114	1.806	0.866	1.266
3009.5	0.106	0.279	0.482	0.456	0.461	0.647	0.961	1.623	0.803	1.146	1.939	2.727	1.219	1.973
3010.0	0.240	0.515	0.697	0.953	0.978	0.793	1.194	1.751	0.980	1.504	1.980	2.723	1.466	1.939
3010.5	0.233	0.541	0.769	1.061	0.994	0.821	1.265	1.916	1.319	1.886	2.443	3.064	1.566	2.117
3011.0	0.232	0.559	0.770	1.113	0.903	0.840	1.317	2.065	1.663	1.633	2.163	3.331	1.603	2.232
3011.5	0.268	0.582	0.811	1.192	0.842	0.910	1.459	2.269	1.127	1.539	2.451	3.711	1.767	2.407
3012.0	0.332	0.716	0.993	1.438	0.832	1.154	1.810	2.711	1.466	1.850	2.826	4.184	2.164	2.774
3012.5	0.440	0.877	1.235	1.763	1.008	1.375	2.114	3.111	1.675	2.197	3.232	4.652	2.461	3.208
3013.0	0.466	0.937	1.334	1.922	1.063	1.450	2.229	3.335	1.773	2.379	3.450	5.031	2.616	3.464
3013.5	0.471	0.955	1.367	1.997	1.070	1.483	2.311	3.534	1.813	2.435	3.633	5.309	2.703	3.667
3014.0	0.500	1.010	1.451	2.131	1.144	1.600	2.529	3.803	1.936	2.607	3.970	5.651	2.919	3.909
3014.5	0.607	1.193	1.702	2.485	1.362	1.767	2.882	4.317	2.213	2.967	4.403	6.332	3.274	4.323
3015.0	0.664	1.278	1.861	2.706	1.616	1.951	3.064	4.617	2.336	3.155	4.709	6.765	3.476	4.654
3015.5	0.660	1.323	1.909	2.815	1.669	2.031	3.209	4.805	2.423	3.303	4.980	7.182	3.653	4.911
3016.0	0.709	1.395	2.012	2.935	1.555	2.130	3.405	5.170	2.579	3.497	5.294	7.615	3.876	5.199
3016.5	0.751	1.474	2.133	3.119	1.631	2.273	3.595	5.424	2.725	3.701	5.572	8.061	4.075	5.496
3017.0	0.735	1.490	2.163	3.171	1.664	2.294	3.677	5.566	2.752	3.757	5.664	8.160	4.120	5.615
3017.5	0.736	1.490	2.174	3.181	1.665	2.299	3.681	5.567	2.761	3.775	5.702	8.251	4.139	5.644
3018.0	0.736	1.504	2.193	3.204	1.666	2.302	3.689	5.573	2.767	3.788	5.727	8.315	4.153	5.669
3018.5	0.736	1.509	2.191	3.215	1.667	2.305	3.685	5.575	2.776	3.801	5.749	8.367	4.169	5.702
3019.0	0.737	1.515	2.194	3.225	1.669	2.310	3.672	5.565	2.785	3.816	5.770	8.416	4.184	5.730
3019.5	0.736	1.521	2.200	3.235	1.671	2.316	3.679	5.564	2.797	3.832	5.791	8.459	4.216	5.800
3020.0	0.748	1.527	2.216	3.245	1.673	2.323	3.685	5.563	2.800	3.847	5.811	8.501	4.230	5.844
3020.5	0.763	1.534	2.225	3.255	1.680	2.333	3.695	5.573	2.805	3.857	5.824	8.547	4.282	5.924
3021.0	0.764	1.540	2.233	3.264	1.683	2.337	3.700	5.580	2.809	3.869	5.840	8.591	4.303	5.964
3021.5	0.765	1.545	2.241	3.272	1.686	2.341	3.704	5.585	2.813	3.881	5.856	8.631	4.317	5.972
3022.0	0.766	1.551	2.246	3.280	1.690	2.344	3.708	5.589	2.816	3.893	5.869	8.670	4.329	5.995
3022.5	0.769	1.557	2.256	3.287	1.696	2.350	3.715	5.596	2.822	3.907	5.877	8.706	4.353	6.028
3023.0	0.773	1.564	2.267	3.300	1.710	2.360	3.724	5.605	2.827	3.922	5.887	8.746	4.387	6.080
3023.5	0.776	1.574	2.276	3.310	1.718	2.367	3.730	5.616	2.831	3.937	5.897	8.789	4.430	6.153
3024.0	0.781	1.583	2.285	3.321	1.733	2.381	3.736	5.626	2.835	3.952	5.907	8.836	4.476	6.227
3024.5	0.785	1.593	2.294	3.333	1.743	2.392	3.744	5.642	2.842	3.967	5.917	8.881	4.511	6.277
3025.0	0.786	1.594	2.297	3.343	1.745	2.394	3.741	5.645	2.844	3.971	5.919	8.885	4.522	6.287
3025.5	0.789	1.605	2.312	3.355	1.747	2.399	3.748	5.655	2.848	3.984	5.927	8.900	4.555	6.336
3026.0	0.803	1.624	2.346	3.387	1.760	2.434	3.825	5.721	2.861	4.010	5.950	8.940	4.607	6.415
3026.5	0.806	1.634	2.356	3.396	1.763	2.443	3.830	5.726	2.864	4.023	5.964	8.969	4.625	6.452
3027.0	0.806	1.639	2.355	3.394	1.767	2.445	3.834	5.730	2.867	4.027	5.967	8.972	4.627	6.457
3027.5	0.810	1.643	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3028.0	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3028.5	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3029.0	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3029.5	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3030.0	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3030.5	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3031.0	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3031.5	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3032.0	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3032.5	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3033.0	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3033.5	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3034.0	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3034.5	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3035.0	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3035.5	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3036.0	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3036.5	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3037.0	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3037.5	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3038.0	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3038.5	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3039.0	0.811	1.644	2.358	3.402	1.773	2.450	3.839	5.734	2.870	4.031	5.970	8.975	4.629	6.461
3039.5	0.811	1.644	2.358	3.402	1.773	2								

Table 4-5 $\int A(\nu) d\nu$ (cont'd)

Sam. No.	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
$p(\text{atm})$	8.42 $\times 10^{-3}$	8.42 $\times 10^{-3}$	8.3 $\times 10^{-3}$	7.6 $\times 10^{-3}$	5.0 $\times 10^{-3}$	9.87 $\times 10^{-3}$	9.89 $\times 10^{-3}$	9.67 $\times 10^{-3}$	9.67 $\times 10^{-3}$	9.87 $\times 10^{-3}$	9.81 $\times 10^{-3}$	9.81 $\times 10^{-3}$	9.49 $\times 10^{-3}$	7.01 $\times 10^{-3}$	2.01 $\times 10^{-3}$
$P_0(\text{atm})$	2.97 $\times 10^{-1}$	9.96 $\times 10^{-1}$	1.16 $\times 10^{-1}$	1.23 $\times 10^{-1}$	9.50 $\times 10^{-2}$	4.93 $\times 10^{-2}$	9.07 $\times 10^{-2}$	2.91 $\times 10^{-1}$	9.09 $\times 10^{-1}$	4.93 $\times 10^{-2}$	9.03 $\times 10^{-2}$	2.92 $\times 10^{-1}$	4.93 $\times 10^{-2}$	1.006 $\times 10^{-1}$	2.08 $\times 10^0$
$\nu(\text{cm}^{-1})$	2.05 $\times 10^{-2}$	2.05 $\times 10^{-2}$	2.19 $\times 10^{-2}$	4.50 $\times 10^{-2}$	4.48 $\times 10^{-2}$	8.85 $\times 10^{-2}$	8.87 $\times 10^{-2}$	8.1 $\times 10^{-2}$	8.87 $\times 10^{-2}$	1.43 $\times 10^{-1}$	3.41 $\times 10^{-1}$	3.41 $\times 10^{-1}$	6.86 $\times 10^{-1}$	6.99 $\times 10^{-1}$	6.97 $\times 10^{-1}$
ν (cm^{-1})	ν (cm^{-1})	ν (cm^{-1})	ν (cm^{-1})	ν (cm^{-1})	ν (cm^{-1})	ν (cm^{-1})	ν (cm^{-1})	ν (cm^{-1})	ν (cm^{-1})	ν (cm^{-1})	ν (cm^{-1})	ν (cm^{-1})	ν (cm^{-1})	ν (cm^{-1})	ν (cm^{-1})
3895.0	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
3895.5	0.164	0.269	0.019	0.129	0.294	0.104	0.150	0.289	0.454	0.254	0.319	0.475	0.374	0.460	0.400
3896.0	0.244	0.454	0.030	0.051	0.162	0.192	0.293	0.549	0.307	0.442	0.655	0.340	0.725	0.512	0.770
3896.5	0.169	0.487	0.054	0.106	0.291	0.333	0.476	0.465	1.167	0.794	1.167	1.167	1.116	1.144	1.500
3897.0	0.498	0.962	0.091	0.165	0.429	0.497	0.549	1.221	1.041	1.110	1.430	1.906	1.533	1.872	2.370
3897.5	0.674	1.304	0.110	0.235	0.614	0.677	0.949	1.610	2.319	1.446	1.491	2.199	1.946	2.362	2.900
3898.0	1.791	1.754	0.172	0.379	0.941	0.475	1.131	2.079	2.937	1.911	2.162	2.495	2.462	2.554	3.070
3898.5	1.415	2.239	0.239	0.564	1.321	1.347	1.772	2.575	3.336	2.394	2.837	3.145	2.459	3.358	3.500
3899.0	1.616	2.729	0.363	0.730	1.727	1.736	2.222	3.767	3.616	2.682	3.334	3.424	3.455	3.858	4.100
3899.5	2.115	3.223	0.447	1.074	2.193	2.192	2.712	3.565	4.336	3.376	3.632	4.133	3.451	4.144	4.500
3900.0	2.712	4.712	0.569	1.326	2.567	2.606	3.152	4.059	4.836	3.867	4.324	4.491	4.450	4.854	5.100
3900.5	3.717	4.173	0.698	1.367	2.796	2.468	3.511	4.538	5.136	4.312	4.619	5.110	4.362	5.358	5.500
3901.0	1.246	4.611	0.594	1.479	3.327	3.096	3.437	5.011	5.436	4.753	5.376	5.444	5.432	5.458	5.700
3901.5	3.664	5.084	0.648	1.633	3.374	3.436	4.252	5.500	5.436	5.224	5.921	5.189	5.824	6.154	5.900
3902.0	4.159	5.579	0.806	1.939	3.841	3.992	4.734	5.795	5.836	5.722	5.799	5.444	6.474	6.454	7.270
3902.5	4.594	6.073	0.961	2.243	4.274	4.344	5.214	6.493	7.336	6.214	6.736	7.144	6.402	7.354	7.900
3903.0	4.344	6.555	1.029	2.165	4.571	4.675	5.129	6.997	7.836	6.693	7.242	7.594	7.614	7.459	8.100
3903.5	5.294	7.037	1.072	2.456	4.871	4.861	6.117	7.479	9.336	7.155	7.747	8.144	7.916	8.366	8.500
3904.0	5.126	7.521	1.094	2.647	5.274	5.345	6.456	7.975	9.836	7.654	8.244	8.444	8.412	8.559	9.100
3904.5	6.273	8.014	1.234	2.962	5.738	5.802	6.951	8.472	9.336	8.144	8.741	9.344	8.744	9.354	9.500
3905.0	6.024	8.511	1.354	3.170	6.144	6.205	7.422	9.344	9.836	8.642	9.274	9.444	9.476	9.974	10.100
3905.5	7.333	9.004	1.414	3.122	6.519	6.570	7.449	9.466	10.336	9.130	9.774	10.344	9.404	10.154	10.500
3906.0	7.453	9.444	1.479	3.513	6.304	6.455	8.114	10.362	10.836	9.614	10.272	10.444	10.444	10.444	10.700
3906.5	7.470	9.864	1.561	3.770	7.270	7.323	8.744	10.447	11.336	10.744	11.152	11.152	10.889	11.155	11.570
3907.0	7.493	10.281	1.631	3.765	7.627	7.444	9.055	10.877	11.814	10.444	11.177	11.440	11.327	11.616	12.170
3907.5	8.144	10.468	1.533	3.824	7.492	7.575	9.142	11.176	12.264	10.661	11.645	12.151	11.593	12.287	12.400
3908.0	8.144	10.712	1.546	3.818	7.554	7.575	9.142	11.176	12.654	10.861	11.764	12.762	11.972	12.694	12.836
3908.5	8.144	10.769	1.651	3.832	7.574	7.444	9.144	11.574	13.122	11.222	11.967	12.164	12.229	13.175	13.480
3909.0	8.144	10.467	1.561	3.856	7.554	7.760	9.424	11.791	13.122	11.192	12.222	12.554	12.692	13.444	13.940
3909.5	8.144	10.474	1.575	3.882	7.541	7.830	9.534	11.971	13.122	11.166	12.632	13.127	12.758	13.927	14.636
3910.0	8.144	11.092	1.574	3.300	7.744	7.861	9.634	12.351	13.324	11.534	12.854	13.784	13.212	14.147	14.447
3910.5	8.144	11.149	1.714	3.969	7.930	8.013	9.743	12.767	13.324	11.745	12.965	14.084	13.575	14.354	14.861
3911.0	8.144	11.249	1.735	3.930	7.937	8.047	9.850	12.767	13.324	11.951	13.177	14.144	13.601	14.455	15.074
3911.5	8.144	11.364	1.767	4.010	7.410	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.712
3912.0	8.144	11.447	1.756	4.025	7.941	8.144	9.941	12.767	13.324	12.756	13.332	14.144	13.932	14.744	15.770
3912.5	8.144	11.553	1.767	4.050	7.992	8.249	10.244	12.974	13.324	12.961	13.349	14.144	14.262	14.744	15.770
3913.0	8.144	11.692	1.760	4.082	8.375	8.367	10.144	13.072	13.324	12.977	13.344	14.144	14.354	14.744	15.770
3913.5	8.144	11.809	1.767	4.133	8.144	8.441	10.144	13.324	13.324	12.974	13.344	14.144	14.354	14.744	15.770
3914.0	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3914.5	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3915.0	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3915.5	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3916.0	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3916.5	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3917.0	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3917.5	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3918.0	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3918.5	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3919.0	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3919.5	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3920.0	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3920.5	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3921.0	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3921.5	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3922.0	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3922.5	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3923.0	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3923.5	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3924.0	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3924.5	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3925.0	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3925.5	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826	14.744	15.770
3926.0	8.144	11.809	1.767	4.010	8.144	8.144	9.921	12.767	13.324	12.792	13.164	14.144	13.826		

4.3 CURVES OF GROWTH OF THE $3847\text{-}3860\text{ cm}^{-1}$ REGION

Figure 4-7 shows a plot of $\int A(\nu) d\nu$ versus uP_e for the $3847\text{-}3860\text{ cm}^{-1}$ region. Each curve is drawn through a set of points which represent samples having approximately the same P_e . The parameter uP_e is convenient to use for samples in which most of the absorption lines satisfy the conditions for the well-known strong-line approximation. This occurs when the widely used quantity $Su/2\pi\alpha \gg 1$ for each line. The sample is then opaque within a few half-widths of each line center, and the only change in absorption with increasing u or P_e occurs in the wings of the lines where the absorption is a function of the parameter uP_e .

If all the lines within the interval satisfied the strong-line condition in every sample, all the curves in Fig. 4-7 would be coincident. The curves are seen to not be coincident; instead, they occur in the order of increasing P_e from top to bottom. This systematic deviation from the single curve results from several weak lines which do not satisfy the strong-line conditions and their contribution is more strongly dependent on u than on P_e .

The curves asymptotically approach a maximum value of 13 cm^{-1} , corresponding to complete absorption [$A(\nu) = 1$] over the entire interval. Most of the transmission through a sample in which $\int A(\nu) d\nu$ is only slightly less than 13 cm^{-1} occurs at wavenumbers in the wings of the lines; thus, the absorptance is nearly a function of uP_e , and there is only a small deviation from the strong-line approximation.

The integrated absorptance of a single strong line with the Lorentz shape is proportional to $(uP_e)^{0.5}$. If all the lines in an interval were strong and there were no overlapping, the integrated absorptance of the interval would also have this proportional relationship, and "curves of growth" such as those in Fig. 4-7 would be coincident and have a slope of 0.5. The slopes of all the curves in the figure are seen to be less than 0.5, a result which undoubtedly is due to overlapping, even at low pressures.

Although the curves are not coincident, they are sufficiently close that it is possible to interpolate between them to determine $\int A(\nu) d\nu$ for a wide variety of samples with pressures different from those shown. Care must be exercised in extrapolating the curves to smaller uP_e , since they will diverge more rapidly, and the slopes will increase to a maximum of one as $Su/2\pi\alpha$ decreases.

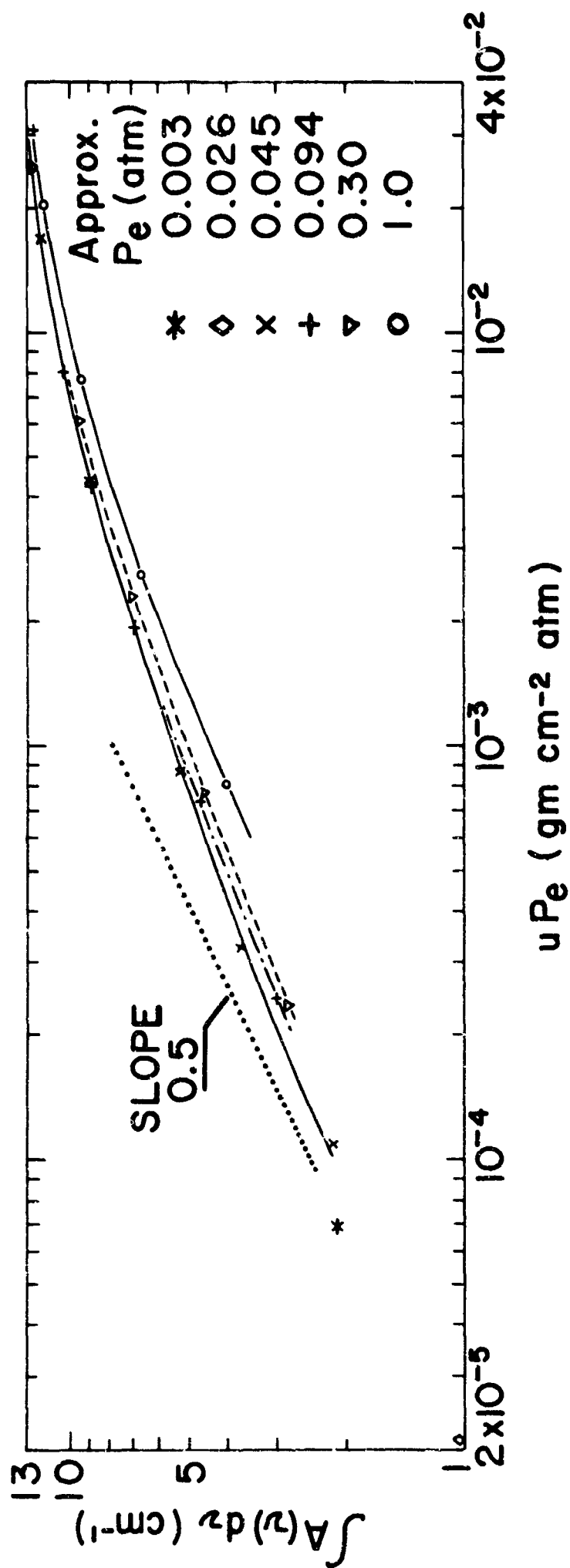


FIG. 4-7

$\int A(v)dv$ VERSUS uP_e FOR THE 3847-3860 cm^{-1} REGION.

Each curve corresponds to the approximate equivalent pressure indicated. No curves are drawn through the points representing samples at 0.003 and 0.026 atm. The dotted curve with a slope of 0.5 is drawn for comparison.

SECTION 5

SAMPLES FOR LINE STRENGTH DETERMINATION

5.1 LINE STRENGTH AND DISCUSSION

The strength of a single absorption line is given by

$$S = \int_0^{\infty} k(\nu) d\nu. \quad (5-1)$$

The absorption coefficient $k(\nu)$ is related to the true transmittance $T'(\nu)$ that would be observed with infinite resolution by

$$T'(\nu) = \exp [-uk(\nu)], \text{ or } -\ln T'(\nu) = uk(\nu). \quad (5-2)$$

By combining these two equations we can relate the line strength to $T'(\nu)$ by

$$S = \frac{1}{u} \int_0^{\infty} -\ln T'(\nu) d\nu. \quad (5-3)$$

As P_e is increased until α is as large or larger than the spectral slitwidth of the spectrometer, the observed transmittance $T(\nu)$ becomes approximately equal to the true transmittance $T'(\nu)$. Under this condition we see that the line strength can be determined from the observable quantity $T(\nu)$ by

$$S = \frac{1}{u} \int_0^{\infty} -\ln T(\nu) d\nu. \quad (5-3a)$$

If $A'(\nu) \equiv 1 - T'(\nu) \ll 1$ for all values of ν being considered, Equation (5-3) can be rewritten as

$$S = \frac{1}{u} \int_0^{\infty} A'(\nu) d\nu. \quad (5-4)$$

It has been shown both theoretically¹⁴ and experimentally² that, under usual spectroscopic conditions,

$$\int A(\nu) d\nu = \int A'(\nu) d\nu, \quad (5-5)$$

provided the integration is carried out over all wavenumbers where there is significant absorption. $A'(\nu)$ and $A(\nu)$ are the true and observed absorptances, respectively. By combining Equations (5-4) and (5-5), we see that the line strength can be determined from $A(\nu)$ by

$$S = \frac{1}{u} \int_0^{\infty} A(\nu) d\nu. \quad (5-4a)$$

At points where several lines contribute to the absorption, the total absorption coefficient is the sum of the coefficients of each of the individual lines. When the conditions for the validity of Equations (5-3a) or (5-4a) are fulfilled, they can also be used to determine the strengths of entire bands by changing the limits of integration.

When the conditions for (5-4a) are satisfied, the absorption is in the so-called linear region. This equation is frequently used to determine the strengths of bands or individual lines; however, we see that it can only be used when $A'(\nu)$ is small. Thus, the accuracy of the measurement is usually limited by the uncertainty in the measurement of the small $A(\nu)$; small errors in the placement of the zero absorptance curve can cause large errors in the values of the strengths which are determined.

When the widths of the lines are sufficiently great that $T'(\nu) \approx T(\nu)$ and Equation (5-3a) is valid, strengths can be determined from spectra in which the absorptance is considerably larger, thus improving the accuracy. Of course, samples in which $T(\nu)$ may be too small must be avoided since $-\ln T(\nu)$ gets large, and small errors in the spectra can cause large errors in the determination of the strengths. Errors arising from the small difference between $T(\nu)$ and $T'(\nu)$ also increase as $T(\nu)$ approaches zero.

The spectra discussed correspond to samples at two different equivalent pressures, approximately 5 and 10 atm, which were used in order to satisfy the conditions for the validity of Equation (5-3a). Thus, the strength of many of the lines can be determined. The samples chosen for a given spectral region provide sufficient absorption that many of the weaker lines can be

observed, yet the absorption is not sufficient for the stronger to be opaque near the centers. Because of the great range in the strengths of the lines within a given region, it would be desirable to have spectra of several different samples covering a wide range of u . But the results here have been limited to one or two samples in a given spectral region because of the large amount of time and effort involved in obtaining and reducing the data. The parameters of the samples discussed in this section are presented in Table 5-1.

The lines in the samples at approximately 10 atm are sufficiently wide that Equation (5-3a) is probably valid for $T(\nu)$ greater than about 0.2 or 0.3. But the lines in the samples at 5 atm are only half as wide, and Equation (5-3a) is probably only valid for $T(\nu)$ greater than approximately 0.7. However, the spectra of the 5 atm samples have the advantage of less overlapping so that many of the weaker lines can still be observed and their strengths estimated. The 10 atm spectra are useful in determining strengths of the stronger lines or of groups of lines; then the 5 atm spectra can be used to determine the contribution of the different lines within the group. It is probable that even 5 atm is too high a pressure for some of the weaker lines adjacent to strong lines; strengths of these lines can be determined more accurately from results at 1 atm which are presented in Section 6.

In the determination of line strengths, it should be borne in mind that much of the structure in the spectra which appears to be composed of a single line actually consists of two or more individual lines which have not been resolved. The positions and approximate strengths of the lines can be obtained from Gates et al.¹

The results are presented in four different groups, each corresponding to a different spectral region with a small amount of overlapping of the four regions. Photographs of the original spectra are shown with the sample number indicated. Following the spectra for each region are tables of transmittance and integrated absorptance which are similar to those presented in Section 4.

Also shown is a table of the quantity $\frac{1}{u} \int_{\nu'}^{\nu} -\ln T(\nu) d\nu$. We see from

Equation (5-2) that this quantity is equivalent to an integrated absorption coefficient $\int K(\nu) d\nu$, where $K(\nu)$ is the sum of the absorption coefficients of all the lines. The lower limit of integration ν' is indicated at the top of the column, and the values are tabulated at intervals of 0.5 cm^{-1} . It is apparent from Equation (5-3a), that the strength of individual lines or groups of lines can be determined from this table by taking the difference between the tabulated values of the integral at the points corresponding to the limits of the region involved.

Since $-\ln T(\nu) \rightarrow \infty$ as $T(\nu) \rightarrow 0$, we wrote the computer program so that values of $-\ln T(\nu) > 10$ are never used in the calculation of the integral. The correct value is used as the integrand if $-\ln T(\nu) \leq 10$; but 10 is used for $-\ln T(\nu) > 10$ ($T(\nu) < 0.0005$). Since $T(\nu) = 0.001$ is the smallest value tabulated, the upper limit of 10 is only applicable at points where $T(\nu)$ is tabulated as 0.000. As pointed out above, a small error in $T(\nu)$ causes a large error in $-\ln T(\nu)$ when $T(\nu)$ is small. Therefore, regions where $T(\nu)$ is small should be avoided when dealing with the tables of $\frac{1}{u} \int -\ln T(\nu) d\nu$. Thus, the limiting of $-\ln T(\nu)$ to values less than or equal to 10 does not effect the usefulness of the table since the places where $-\ln T(\nu)$ is large should not be used anyway. Values were calculated through a few such regions in order to make the table continuous; but it should be emphasized that the tables should not be used over regions where $T(\nu)$ is small.

The greatest source of error in the spectra and tables probably arises from the misplacement of the zero absorptance curve. This is particularly true for the spectral region considered here since the band absorbs over such a wide region. The accuracy depends to a large extent on the distance from a "tie point" where the absorptance is known to be zero, or so small as to be negligible. The error in $A(\nu)$ due to misplacement of the background is probably less than 0.01 at most wavenumbers; although it may be somewhat higher below 3300 cm^{-1} , where the recorder deflection was small and the nearest tie point was a few hundred cm^{-1} away.

5.2 BAND STRENGTHS

Without determining the strengths of the individual absorption lines, we can obtain quite a lot of information about the strengths of the bands in this region from the tables of $\frac{1}{u} \int -\ln T(\nu) d\nu$. The ν_1 and ν_3 bands overlap so much that the contributions of each cannot be determined without considering the absorption by individual lines within each of the bands. We will not do this, but we will determine the combined strengths of the two bands.

Since nearly all the absorption below 3385 cm^{-1} is due to the $2\nu_2$ band, we will consider only the region from 3385 to 4130 cm^{-1} . Values of $\frac{1}{u} \int -\ln T(\nu) d\nu$ were taken from Sample 31 for the 3385 - 3455 cm^{-1} region, Sample 32 for 3455 - 3555 cm^{-1} , Sample 34 for 3555 - 3960 cm^{-1} , and Sample 36 for 3960 - 4130 cm^{-1} . By summing all the values, we obtained $27.4 \times 10^4 \text{ cm}^{-1} \text{ gm}^{-1} \text{ cm}^2$. Approximately 99% of this occurs in the 3555 - 3960 cm^{-1} interval for which Sample 34 was used. We see from the spectrum of this sample that there are places where $T(\nu)$ is as small as approximately 0.10. As

pointed out above, when $T(\nu)$ is this small, $\int -\ln T(\nu)$ will be slightly less than $\int -\ln T'(\nu)$ when the widths of the lines are not several times as great as the spectrometer slitwidth. Thus, we must consider the error which might be introduced, since the half-width of the lines is probably about 1 cm^{-1} and the spectral slitwidth is approximately 0.7 cm^{-1} .

We can get some idea of the error by comparing the values obtained from Samples 33 and 34; both of these samples have the same value of u , and their equivalent pressures are 5 and 10 atm, respectively. We see that $\frac{1}{u} \int -\ln T(\nu) d\nu$ increased by about 7 percent (2.48×10^4 to 2.65×10^4) when the pressure was doubled; most of this increase is probably due to a decrease in the systematic error described in the previous paragraph. Since the value increased by only 7 percent in going from 5 to 10 atm, it is probable that not more than 1 or 2 percent increase would be observed if the pressure were increased further until the structure were smoothed out.

Thus, if we assume a 2 percent increase, we obtain $28 \times 10^4 \text{ cm}^{-1} \text{ gm}^{-1} \text{ cm}^2$ for the combined strengths of the ν_1 and ν_3 bands. The estimated uncertainty is $\pm 1.5 \times 10^4 \text{ cm}^{-1} \text{ gm}^{-1} \text{ cm}^2$. Gates et al¹ used strengths of 2.7×10^4 for ν_1 and 26.3×10^4 for ν_3 in their calculations of line strengths. Their total, 29.0×10^4 , is in good agreement with our results. The value for ν_3 used by Gates et al is based on a measurement of a single line by Jaffe and Benedict.¹⁵

From the results between 2990 and 3385 cm^{-1} , we determined a strength of $3.5 \pm 0.7 \times 10^3 \text{ cm}^{-1} \text{ gm}^{-1} \text{ cm}^2$ for the $2\nu_2$ band. The relatively large uncertainty is due to the overlapping of the wings of the ν_1 and ν_3 bands and to the possible misplacement of the zero absorbance curve. Our value is considerably larger than 2.2×10^3 , which was used by Gates et al.

5.3 RESULTS

TABLE 5-1
SAMPLE PARAMETERS

Sam. No.	p torr	P torr	P _e [*] torr	p atm	P atm	P _e [*] atm	L Path m	u gm/cm ²
30	6.4	3800	3825	0.00842	5.00	5.03	32.9	0.0205
31	6.4	7600	7625	0.00842	10.00	10.03	32.9	0.0205
32	6.3	7600	7625	0.00829	10.00	10.03	4.16	0.00256
33	4.0	3800	3816	0.00526	5.00	5.02	2.10	0.00080
34	4.0	7600	7616	0.00526	10.00	10.02	2.10	0.00080
35	6.4	3800	3825	0.00842	5.00	5.03	32.9	0.0205
36	6.4	7600	7625	0.00842	10.00	10.03	32.9	0.0205

*P_e = P + 4p in accordance with Equation (3-8) and the results of Section 3. All samples were at room temperature, 296°K.

The regions covered by each sample are as follows:

30 and 31, 2990 - 3580 cm⁻¹
 32, 3430 - 3635 cm⁻¹
 33 and 34, 3540 - 3960 cm⁻¹
 35 and 36, 3935 - 4130 cm⁻¹.

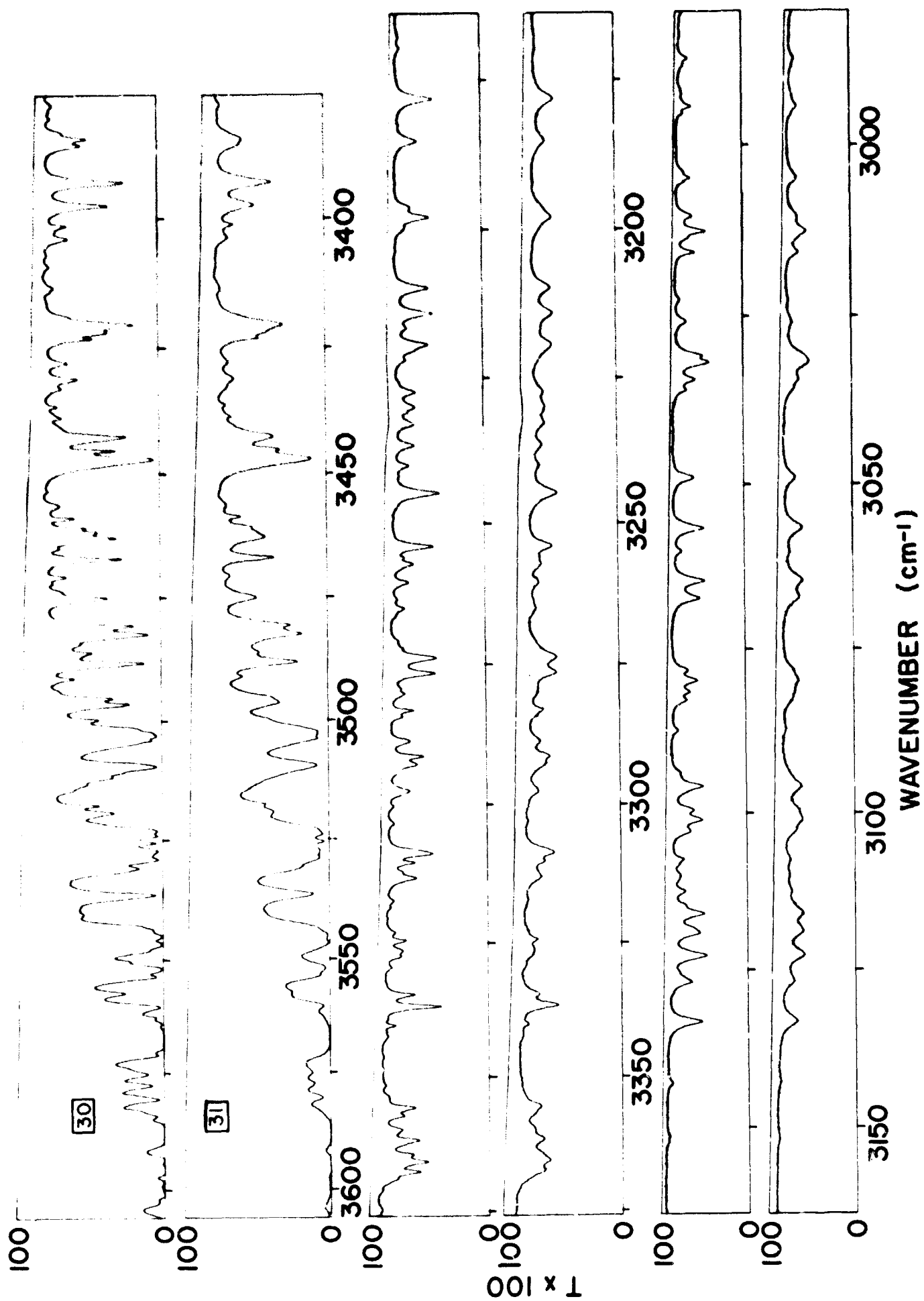


Fig.5-1

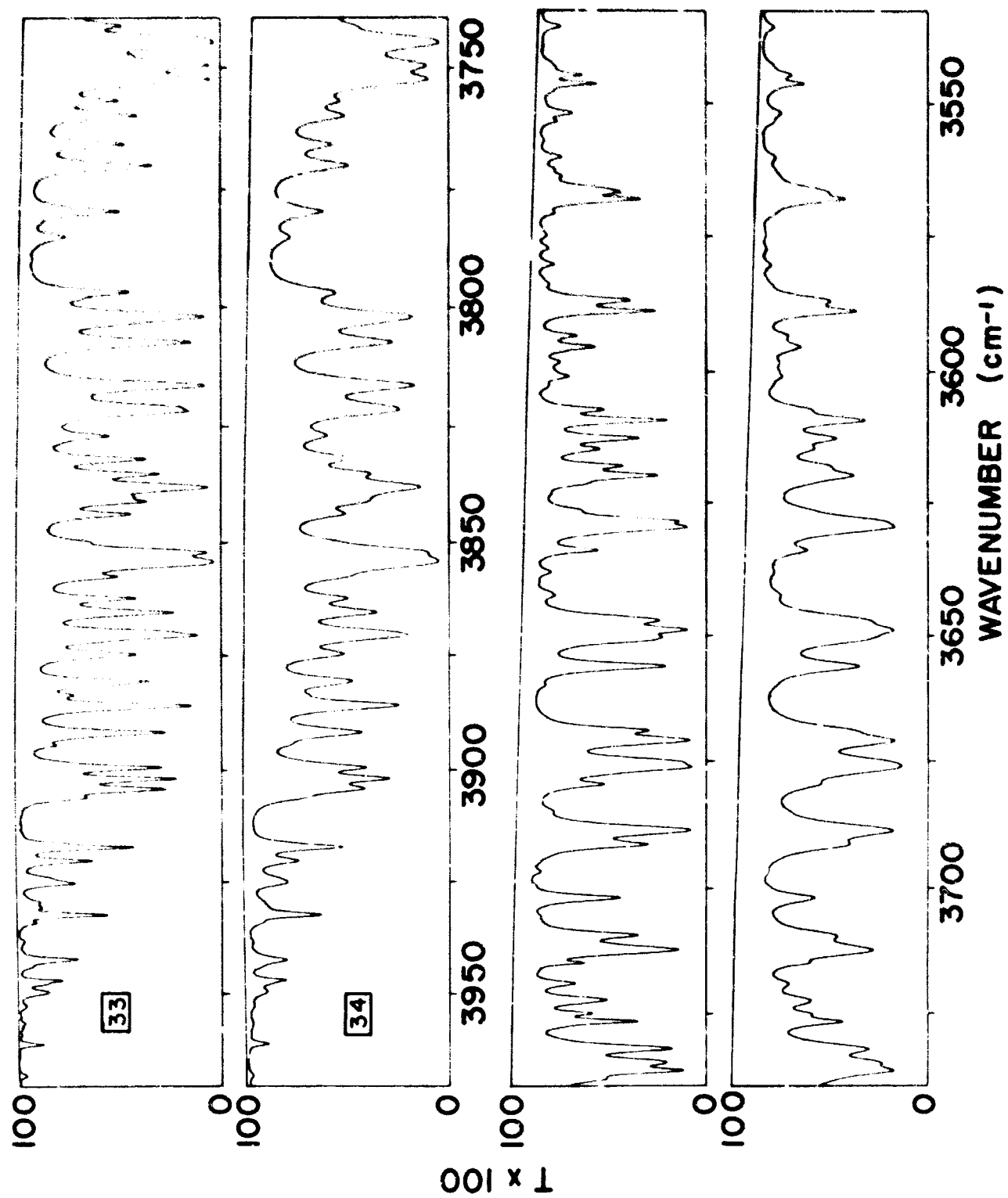


Fig. 5-3

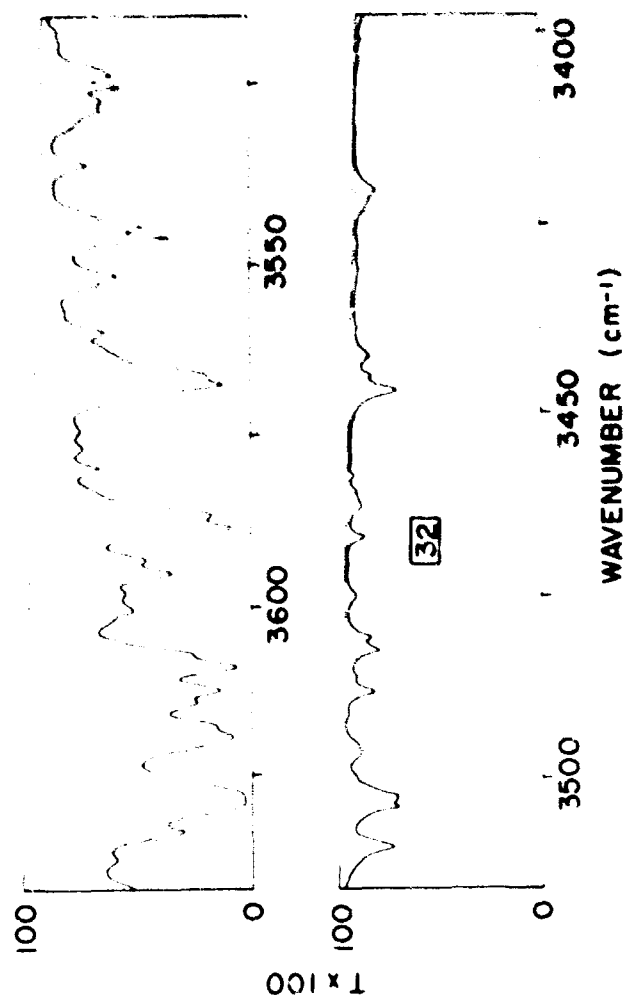


Fig 5-2

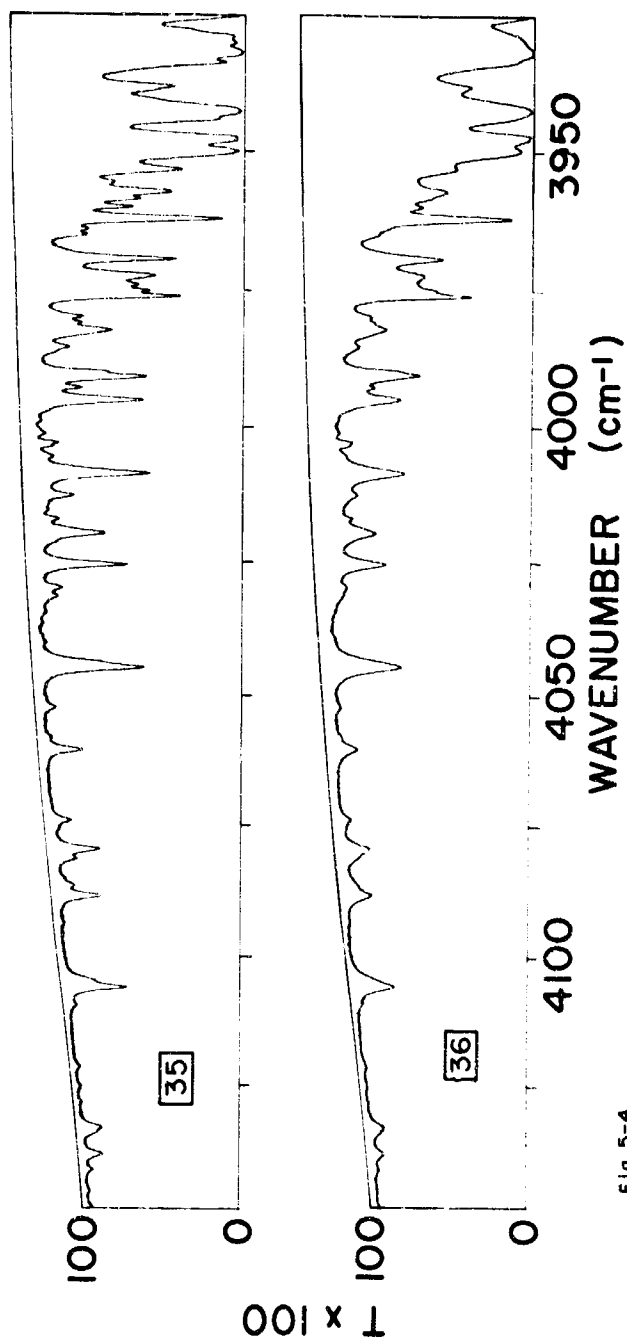


Fig. 5-4

Table 5-2

[illegible]

Table 5-2 (Cont'd)

Line No.	Wavelength (microns)	Frequency (cm ⁻¹)	Line No.	Wavelength (microns)	Frequency (cm ⁻¹)	Line No.	Wavelength (microns)	Frequency (cm ⁻¹)	Line No.	Wavelength (microns)	Frequency (cm ⁻¹)	Line No.	Wavelength (microns)	Frequency (cm ⁻¹)	Line No.	Wavelength (microns)	Frequency (cm ⁻¹)	
3110.0	3.11943	80.7	80.5	3134.0	3.19041	78.1	78.6	3158.0	3.16556	95.1	91.5	3182.0	3.14258	97.1	85.7	3206.0	3.11915	91.7
3110.2	3.11937	81.0	81.1	3134.2	3.19043	78.4	80.3	3158.2	3.16558	95.6	91.1	3182.2	3.14258	97.1	85.7	3206.2	3.11915	91.7
3110.4	3.11930	81.3	81.1	3134.4	3.19043	78.7	80.3	3158.4	3.16560	95.2	91.5	3182.4	3.14258	97.1	85.7	3206.4	3.11915	91.7
3110.6	3.11923	82.3	80.9	3134.6	3.19037	80.3	82.1	3158.6	3.16558	95.0	91.3	3182.6	3.14258	97.1	85.7	3206.6	3.11915	91.1
3110.8	3.11916	83.9	80.2	3134.8	3.19037	80.7	81.7	3158.8	3.16558	94.9	91.2	3182.8	3.14258	97.1	85.7	3206.8	3.11915	91.0
3111.0	3.11909	85.1	79.7	3135.0	3.18979	84.9	85.1	3159.0	3.16556	94.8	91.2	3183.0	3.14258	97.1	85.7	3207.0	3.11915	91.2
3111.2	3.11909	85.1	79.9	3135.2	3.18979	85.6	84.7	3159.2	3.16556	94.7	91.9	3183.2	3.14258	97.1	85.7	3207.2	3.11915	90.3
3111.4	3.11909	85.1	80.6	3135.4	3.18979	86.0	87.0	3159.4	3.16556	95.3	91.7	3183.4	3.14258	97.1	85.7	3207.4	3.11915	90.1
3111.6	3.11909	85.1	80.6	3135.6	3.18979	86.2	87.0	3159.6	3.16556	95.3	91.6	3183.6	3.14258	97.1	85.7	3207.6	3.11915	89.5
3111.8	3.11909	85.1	80.6	3135.8	3.18979	86.6	87.3	3159.8	3.16556	95.1	91.7	3183.8	3.14258	97.1	85.7	3207.8	3.11915	88.8
3112.0	3.11909	85.1	80.6	3136.0	3.18979	87.1	87.3	3160.0	3.16556	94.7	91.3	3184.0	3.14258	97.1	85.7	3208.0	3.11915	88.9
3112.2	3.11909	85.1	80.6	3136.2	3.18979	87.5	87.6	3160.2	3.16556	94.8	91.5	3184.2	3.14258	97.1	85.7	3208.2	3.11915	88.9
3112.4	3.11909	85.1	80.6	3136.4	3.18979	87.9	88.1	3160.4	3.16556	94.8	91.6	3184.4	3.14258	97.1	85.7	3208.4	3.11915	88.9
3112.6	3.11909	85.1	80.6	3136.6	3.18979	88.3	88.2	3160.6	3.16556	94.8	91.6	3184.6	3.14258	97.1	85.7	3208.6	3.11915	88.9
3112.8	3.11909	85.1	80.6	3136.8	3.18979	88.7	88.8	3160.8	3.16556	94.8	91.6	3184.8	3.14258	97.1	85.7	3208.8	3.11915	88.9
3113.0	3.11909	85.1	80.6	3137.0	3.18979	89.1	89.2	3161.0	3.16556	94.8	91.6	3185.0	3.14258	97.1	85.7	3209.0	3.11915	88.9
3113.2	3.11909	85.1	80.6	3137.2	3.18979	89.5	89.9	3161.2	3.16556	94.8	91.7	3185.2	3.14258	97.1	85.7	3209.2	3.11915	88.9
3113.4	3.11909	85.1	80.6	3137.4	3.18979	89.9	89.9	3161.4	3.16556	94.8	91.7	3185.4	3.14258	97.1	85.7	3209.4	3.11915	88.9
3113.6	3.11909	85.1	80.6	3137.6	3.18979	90.3	89.4	3161.6	3.16556	94.8	91.7	3185.6	3.14258	97.1	85.7	3209.6	3.11915	88.9
3113.8	3.11909	85.1	80.6	3137.8	3.18979	90.7	90.3	3161.8	3.16556	94.8	91.7	3185.8	3.14258	97.1	85.7	3209.8	3.11915	88.9
3114.0	3.11909	85.1	80.6	3138.0	3.18979	91.1	90.2	3162.0	3.16556	94.8	91.7	3186.0	3.14258	97.1	85.7	3210.0	3.11915	88.9
3114.2	3.11909	85.1	80.6	3138.2	3.18979	91.5	89.9	3162.2	3.16556	94.8	91.7	3186.2	3.14258	97.1	85.7	3210.2	3.11915	88.9
3114.4	3.11909	85.1	80.6	3138.4	3.18979	91.9	89.9	3162.4	3.16556	94.8	91.7	3186.4	3.14258	97.1	85.7	3210.4	3.11915	88.9
3114.6	3.11909	85.1	80.6	3138.6	3.18979	92.3	89.8	3162.6	3.16556	94.8	91.7	3186.6	3.14258	97.1	85.7	3210.6	3.11915	88.9
3114.8	3.11909	85.1	80.6	3138.8	3.18979	92.7	89.8	3162.8	3.16556	94.8	91.7	3186.8	3.14258	97.1	85.7	3210.8	3.11915	88.9
3115.0	3.11909	85.1	80.6	3139.0	3.18979	93.1	89.7	3163.0	3.16556	94.8	91.7	3187.0	3.14258	97.1	85.7	3211.0	3.11915	88.9
3115.2	3.11909	85.1	80.6	3139.2	3.18979	93.5	89.7	3163.2	3.16556	94.8	91.7	3187.2	3.14258	97.1	85.7	3211.2	3.11915	88.9
3115.4	3.11909	85.1	80.6	3139.4	3.18979	93.9	89.7	3163.4	3.16556	94.8	91.7	3187.4	3.14258	97.1	85.7	3211.4	3.11915	88.9
3115.6	3.11909	85.1	80.6	3139.6	3.18979	94.3	89.7	3163.6	3.16556	94.8	91.7	3187.6	3.14258	97.1	85.7	3211.6	3.11915	88.9
3115.8	3.11909	85.1	80.6	3139.8	3.18979	94.7	89.7	3163.8	3.16556	94.8	91.7	3187.8	3.14258	97.1	85.7	3211.8	3.11915	88.9
3116.0	3.11909	85.1	80.6	3140.0	3.18979	95.1	89.7	3164.0	3.16556	94.8	91.7	3188.0	3.14258	97.1	85.7	3212.0	3.11915	88.9
3116.2	3.11909	85.1	80.6	3140.2	3.18979	95.5	89.7	3164.2	3.16556	94.8	91.7	3188.2	3.14258	97.1	85.7	3212.2	3.11915	88.9
3116.4	3.11909	85.1	80.6	3140.4	3.18979	95.9	89.7	3164.4	3.16556	94.8	91.7	3188.4	3.14258	97.1	85.7	3212.4	3.11915	88.9
3116.6	3.11909	85.1	80.6	3140.6	3.18979	96.3	89.7	3164.6	3.16556	94.8	91.7	3188.6	3.14258	97.1	85.7	3212.6	3.11915	88.9
3116.8	3.11909	85.1	80.6	3140.8	3.18979	96.7	89.7	3164.8	3.16556	94.8	91.7	3188.8	3.14258	97.1	85.7	3212.8	3.11915	88.9
3117.0	3.11909	85.1	80.6	3141.0	3.18979	97.1	89.7	3165.0	3.16556	94.8	91.7	3189.0	3.14258	97.1	85.7	3213.0	3.11915	88.9
3117.2	3.11909	85.1	80.6	3141.2	3.18979	97.5	89.7	3165.2	3.16556	94.8	91.7	3189.2	3.14258	97.1	85.7	3213.2	3.11915	88.9
3117.4	3.11909	85.1	80.6	3141.4	3.18979	97.9	89.7	3165.4	3.16556	94.8	91.7	3189.4	3.14258	97.1	85.7	3213.4	3.11915	88.9
3117.6	3.11909	85.1	80.6	3141.6	3.18979	98.3	89.7	3165.6	3.16556	94.8	91.7	3189.6	3.14258	97.1	85.7	3213.6	3.11915	88.9
3117.8	3.11909	85.1	80.6	3141.8	3.18979	98.7	89.7	3165.8	3.16556	94.8	91.7	3189.8	3.14258	97.1	85.7	3213.8	3.11915	88.9
3118.0	3.11909	85.1	80.6	3142.0	3.18979	99.1	89.7	3166.0	3.16556	94.8	91.7	3190.0	3.14258	97.1	85.7	3214.0	3.11915	88.9
3118.2	3.11909	85.1	80.6	3142.2	3.18979	99.5	89.7	3166.2	3.16556	94.8	91.7	3190.2	3.14258	97.1	85.7	3214.2	3.11915	88.9
3118.4	3.11909	85.1	80.6	3142.4	3.18979	99.9	89.7	3166.4	3.16556	94.8	91.7	3190.4	3.14258	97.1	85.7	3214.4	3.11915	88.9
3118.6	3.11909	85.1	80.6	3142.6	3.18979	100.3	89.7	3166.6	3.16556	94.8	91.7	3190.6	3.14258	97.1	85.7	3214.6	3.11915	88.9
3118.8	3.11909	85.1	80.6	3142.8	3.18979	100.7	89.7	3166.8	3.16556	94.8	91.7	3190.8	3.14258	97.1	85.7	3214.8	3.11915	88.9
3119.0	3.11909	85.1	80.6	3143.0	3.18979	101.1	89.7	3167.0	3.16556	94.8	91.7	3191.0	3.14258	97.1	85.7	3215.0	3.11915	88.9
3119.2	3.11909	85.1	80.6	3143.2	3.18979	101.5	89.7	3167.2	3.16556	94.8	91.7	3191.2	3.14258	97.1	85.7	3215.2	3.11915	88.9
3119.4	3.11909	85.1	80.6	3143.4	3.18979	101.9	89.7	3167.4	3.16556	94.8	91.7	3191.4	3.14258	97.1	85.7	3215.4	3.11915	88.9
3119.6	3.11909	85.1	80.6	3143.6	3.18979	102.3	89.7	3167.6	3.16556	94.8	91.7	3191.6	3.14258	97.1	85.7	3215.6	3.11915	88.9
3119.8	3.11909	85.1	80.6	3143.8	3.18979	102.7	89.7	3167.8	3.16556	94.8	91.7	3191.8	3.14258	97.1	85.7	3215.8	3.11915	88.9
3120.0	3.11909	85.1	80.6	3144.0	3.18979	103.1	89.7	3168.0	3.16556	94.8	91.7	3192.0	3.14258	97.1	85.7	3216.0	3.11915	88.9
3120.2	3.11909	85.1	80.6	3144.2	3.18979	103.5	89.7	3168.2	3.16556	94.8	91.7	3192.2	3.14258	97.1	85.7	3216.2	3.11915	88.9
3120.4	3.11909	85.1	80.6	3144.4	3.18979	103.9	89.7	3168.4	3.16556	94.8	91.7	3192.4	3.14258	97.1	85.7	3216.4	3.11915	88.9
3120.6	3.11909	85.1	80.6	3144.6	3.18979	104.3	89.7	3168.6	3.16556	94.8	91.7	3192.6	3.14258	97.1	85.7	3216.6	3.11915	88.9
3120.8	3.11909	85.1	80.6	3144.8	3.18979	104.7	89.7	3168.8	3.16556	94.8	91.7	3192.8	3.14258	97.1	85.7	3216.8	3.11915	88.9
3121.0	3.11909	85.1	80.6	3145.0	3.18979	105.1	89.7	3169.0	3.16556	94.8	91.7	3193.0	3.14258	97.1	85.7	3217.0	3.11915	88.9
3121.2	3.11909	85.1	80.6	3145.2	3.18979	105.5	89.7	3169.2	3.16556	94.8	91.7	3193.2	3.14258	97.1	85.7	3217.2	3.11915	88.9
3121.4	3.11909	85.1	80.6	3145.4	3.18979	105.9	89.7	3169.4	3.16556	94.8	91.7	3193.4	3.14258	97.1	85.7	3217.4	3.11915	88.9
3121.6	3.11909	85.1	80.6	3145.6	3.18979	106.3	89.7	3169.6	3.16556	94.8	91.7	3193.6	3.14258	97.1	85.7	3217.6	3.11915	88.9
3121.8	3.11909	85.1	80.6	3145.8	3.18979	106.7	89.7	3169.8	3.16556	94.8	91.7	3193.8	3.14258	97.1	85.7	3217.8	3.1191	

Table 5-2 (Cont'd)

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Table 5-2 (Cont'd)

Wavelength (microns)	Frequency (10 ¹² Hz)	Refractive Index (n)	Extinction Coefficient (k)	Wavelength (microns)	Frequency (10 ¹² Hz)	Refractive Index (n)	Extinction Coefficient (k)	Wavelength (microns)	Frequency (10 ¹² Hz)	Refractive Index (n)	Extinction Coefficient (k)	Wavelength (microns)	Frequency (10 ¹² Hz)	Refractive Index (n)	Extinction Coefficient (k)	Wavelength (microns)	Frequency (10 ¹² Hz)	Refractive Index (n)	Extinction Coefficient (k)
3350.0	2.98507	0.93	0.7	3370.0	2.96334	0.93	0.7	3390.0	2.94206	0.93	0.7	3410.0	2.92127	0.93	0.7	3430.0	2.90097	0.93	0.7
3350.2	2.98497	0.93	0.7	3370.2	2.96327	0.93	0.7	3390.2	2.94199	0.93	0.7	3410.2	2.92120	0.93	0.7	3430.2	2.90090	0.93	0.7
3350.4	2.98487	0.93	0.7	3370.4	2.96319	0.93	0.7	3390.4	2.94191	0.93	0.7	3410.4	2.92112	0.93	0.7	3430.4	2.90082	0.93	0.7
3350.6	2.98477	0.93	0.7	3370.6	2.96311	0.93	0.7	3390.6	2.94183	0.93	0.7	3410.6	2.92104	0.93	0.7	3430.6	2.90074	0.93	0.7
3350.8	2.98467	0.93	0.7	3370.8	2.96303	0.93	0.7	3390.8	2.94175	0.93	0.7	3410.8	2.92096	0.93	0.7	3430.8	2.90066	0.93	0.7
3351.0	2.98457	0.93	0.7	3371.0	2.96295	0.93	0.7	3391.0	2.94167	0.93	0.7	3411.0	2.92088	0.93	0.7	3431.0	2.90058	0.93	0.7
3351.2	2.98447	0.93	0.7	3371.2	2.96287	0.93	0.7	3391.2	2.94159	0.93	0.7	3411.2	2.92080	0.93	0.7	3431.2	2.90050	0.93	0.7
3351.4	2.98437	0.93	0.7	3371.4	2.96279	0.93	0.7	3391.4	2.94151	0.93	0.7	3411.4	2.92072	0.93	0.7	3431.4	2.90042	0.93	0.7
3351.6	2.98427	0.93	0.7	3371.6	2.96271	0.93	0.7	3391.6	2.94143	0.93	0.7	3411.6	2.92064	0.93	0.7	3431.6	2.90034	0.93	0.7
3351.8	2.98417	0.93	0.7	3371.8	2.96263	0.93	0.7	3391.8	2.94135	0.93	0.7	3411.8	2.92056	0.93	0.7	3431.8	2.90026	0.93	0.7
3352.0	2.98407	0.93	0.7	3372.0	2.96255	0.93	0.7	3392.0	2.94127	0.93	0.7	3412.0	2.92048	0.93	0.7	3432.0	2.90018	0.93	0.7
3352.2	2.98397	0.93	0.7	3372.2	2.96247	0.93	0.7	3392.2	2.94119	0.93	0.7	3412.2	2.92040	0.93	0.7	3432.2	2.90010	0.93	0.7
3352.4	2.98387	0.93	0.7	3372.4	2.96239	0.93	0.7	3392.4	2.94111	0.93	0.7	3412.4	2.92032	0.93	0.7	3432.4	2.90002	0.93	0.7
3352.6	2.98377	0.93	0.7	3372.6	2.96231	0.93	0.7	3392.6	2.94103	0.93	0.7	3412.6	2.92024	0.93	0.7	3432.6	2.89994	0.93	0.7
3352.8	2.98367	0.93	0.7	3372.8	2.96223	0.93	0.7	3392.8	2.94095	0.93	0.7	3412.8	2.92016	0.93	0.7	3432.8	2.89986	0.93	0.7
3353.0	2.98357	0.93	0.7	3373.0	2.96215	0.93	0.7	3393.0	2.94087	0.93	0.7	3413.0	2.92008	0.93	0.7	3433.0	2.89978	0.93	0.7
3353.2	2.98347	0.93	0.7	3373.2	2.96207	0.93	0.7	3393.2	2.94079	0.93	0.7	3413.2	2.91999	0.93	0.7	3433.2	2.89970	0.93	0.7
3353.4	2.98337	0.93	0.7	3373.4	2.96199	0.93	0.7	3393.4	2.94071	0.93	0.7	3413.4	2.91991	0.93	0.7	3433.4	2.89962	0.93	0.7
3353.6	2.98327	0.93	0.7	3373.6	2.96191	0.93	0.7	3393.6	2.94063	0.93	0.7	3413.6	2.91983	0.93	0.7	3433.6	2.89954	0.93	0.7
3353.8	2.98317	0.93	0.7	3373.8	2.96183	0.93	0.7	3393.8	2.94055	0.93	0.7	3413.8	2.91975	0.93	0.7	3433.8	2.89946	0.93	0.7
3354.0	2.98307	0.93	0.7	3374.0	2.96175	0.93	0.7	3394.0	2.94047	0.93	0.7	3414.0	2.91967	0.93	0.7	3434.0	2.89938	0.93	0.7
3354.2	2.98297	0.93	0.7	3374.2	2.96167	0.93	0.7	3394.2	2.94039	0.93	0.7	3414.2	2.91959	0.93	0.7	3434.2	2.89930	0.93	0.7
3354.4	2.98287	0.93	0.7	3374.4	2.96159	0.93	0.7	3394.4	2.94031	0.93	0.7	3414.4	2.91951	0.93	0.7	3434.4	2.89922	0.93	0.7
3354.6	2.98277	0.93	0.7	3374.6	2.96151	0.93	0.7	3394.6	2.94023	0.93	0.7	3414.6	2.91943	0.93	0.7	3434.6	2.89914	0.93	0.7
3354.8	2.98267	0.93	0.7	3374.8	2.96143	0.93	0.7	3394.8	2.94015	0.93	0.7	3414.8	2.91935	0.93	0.7	3434.8	2.89906	0.93	0.7
3355.0	2.98257	0.93	0.7	3375.0	2.96135	0.93	0.7	3395.0	2.94007	0.93	0.7	3415.0	2.91927	0.93	0.7	3435.0	2.89898	0.93	0.7
3355.2	2.98247	0.93	0.7	3375.2	2.96127	0.93	0.7	3395.2	2.94000	0.93	0.7	3415.2	2.91919	0.93	0.7	3435.2	2.89890	0.93	0.7
3355.4	2.98237	0.93	0.7	3375.4	2.96119	0.93	0.7	3395.4	2.93992	0.93	0.7	3415.4	2.91911	0.93	0.7	3435.4	2.89882	0.93	0.7
3355.6	2.98227	0.93	0.7	3375.6	2.96111	0.93	0.7	3395.6	2.93984	0.93	0.7	3415.6	2.91903	0.93	0.7	3435.6	2.89874	0.93	0.7
3355.8	2.98217	0.93	0.7	3375.8	2.96103	0.93	0.7	3395.8	2.93976	0.93	0.7	3415.8	2.91895	0.93	0.7	3435.8	2.89866	0.93	0.7
3356.0	2.98207	0.93	0.7	3376.0	2.96095	0.93	0.7	3396.0	2.93968	0.93	0.7	3416.0	2.91887	0.93	0.7	3436.0	2.89858	0.93	0.7
3356.2	2.98197	0.93	0.7	3376.2	2.96087	0.93	0.7	3396.2	2.93960	0.93	0.7	3416.2	2.91879	0.93	0.7	3436.2	2.89850	0.93	0.7
3356.4	2.98187	0.93	0.7	3376.4	2.96079	0.93	0.7	3396.4	2.93952	0.93	0.7	3416.4	2.91871	0.93	0.7	3436.4	2.89842	0.93	0.7
3356.6	2.98177	0.93	0.7	3376.6	2.96071	0.93	0.7	3396.6	2.93944	0.93	0.7	3416.6	2.91863	0.93	0.7	3436.6	2.89834	0.93	0.7
3356.8	2.98167	0.93	0.7	3376.8	2.96063	0.93	0.7	3396.8	2.93936	0.93	0.7	3416.8	2.91855	0.93	0.7	3436.8	2.89826	0.93	0.7
3357.0	2.98157	0.93	0.7	3377.0	2.96055	0.93	0.7	3397.0	2.93928	0.93	0.7	3417.0	2.91847	0.93	0.7	3437.0	2.89818	0.93	0.7
3357.2	2.98147	0.93	0.7	3377.2	2.96047	0.93	0.7	3397.2	2.93920	0.93	0.7	3417.2	2.91839	0.93	0.7	3437.2	2.89810	0.93	0.7
3357.4	2.98137	0.93	0.7	3377.4	2.96039	0.93	0.7	3397.4	2.93912	0.93	0.7	3417.4	2.91831	0.93	0.7	3437.4	2.89802	0.93	0.7
3357.6	2.98127	0.93	0.7	3377.6	2.96031	0.93	0.7	3397.6	2.93904	0.93	0.7	3417.6	2.91823	0.93	0.7	3437.6	2.89794	0.93	0.7
3357.8	2.98117	0.93	0.7	3377.8	2.96023	0.93	0.7	3397.8	2.93896	0.93	0.7	3417.8	2.91815	0.93	0.7	3437.8	2.89786	0.93	0.7
3358.0	2.98107	0.93	0.7	3378.0	2.96015	0.93	0.7	3398.0	2.93888	0.93	0.7	3418.0	2.91807	0.93	0.7	3438.0	2.89778	0.93	0.7
3358.2	2.98097	0.93	0.7	3378.2	2.96007	0.93	0.7	3398.2	2.93880	0.93	0.7	3418.2	2.91799	0.93	0.7	3438.2	2.89770	0.93	0.7
3358.4	2.98087	0.93	0.7	3378.4	2.96000	0.93	0.7	3398.4	2.93872	0.93	0.7	3418.4	2.91791	0.93	0.7	3438.4	2.89762	0.93	0.7
3358.6	2.98077	0.93	0.7	3378.6	2.95992	0.93	0.7	3398.6	2.93864	0.93	0.7	3418.6	2.91783	0.93	0.7	3438.6	2.89754	0.93	0.7
3358.8	2.98067	0.93	0.7	3378.8	2.95984	0.93	0.7	3398.8	2.93856	0.93	0.7	3418.8	2.91775	0.93	0.7	3438.8	2.89746	0.93	0.7
3359.0	2.98057	0.93	0.7	3379.0	2.95976	0.93	0.7	3399.0	2.93848	0.93	0.7	3419.0	2.91767	0.93	0.7	3439.0	2.89738	0.93	0.7
3359.2	2.98047	0.93	0.7	3379.2	2.95968	0.93	0.7	3399.2	2.93840	0.93	0.7	3419.2	2.91759	0.93	0.7	3439.2	2.89730	0.93	0.7
3359.4	2.98037	0.93	0.7	3379.4	2.95960	0.93	0.7	3399.4	2.93832	0.93	0.7	3419.4	2.91751	0.93	0.7	3439.4	2.89722	0.93	0.7
3359.6	2.98027	0.93	0.7	3379.6	2.95952	0.93	0.7	3399.6	2.93824	0.93	0.7	3419.6	2.91743	0.93	0.7	3439.6	2.89714	0.93	0.7
3359.8	2.98017	0.93	0.7	3379.8	2.95944	0.93	0.7	3399.8	2.93816	0.93	0.7	3419.8	2.91735	0.93	0.7	3439.8	2.89706	0.93	0.7
3360.0	2.98007	0.93	0.7	3380.0	2.95936	0.93	0.7	3400.0	2.93808	0.93	0.7	3420.0	2.91727	0.93	0.7	3440.0	2.89698	0.93	0.7
3360.2	2.97997	0.93	0.7	3380.2	2.95928	0.93	0.7	3400.2	2.93800	0.93	0.7	3420.2	2.91719	0.93	0.7	3440.2	2.89690	0.93	0.7
3360.4	2.97987	0.93	0.7	3380.4	2.95920	0.93	0.7	3400.4	2.93792	0.93	0.7	3420.4	2.91711	0.93	0.7	3440.4	2.89682	0.93	0.7
3360.6	2.97977	0.93	0.7	3380.6	2.95912	0.93	0.7	3400.6	2.93784	0.93	0.7	3420.6	2.91703	0.93	0.7	3440.6	2.89674	0.93	0.7
3360.8	2.97967	0.93	0.7	3380.8	2.95904	0.93	0.7	3400.8	2.93776	0.93	0.7	3420.8	2.91695	0.93	0.7	3440.8	2.89666	0.93	0.7
3361.0	2.97957	0.93	0.7	3381.0	2.95896	0.93	0.7	3401.0	2.93768	0.93	0.7	3421.0	2.91687	0.93	0.7	3441.0	2.89658	0.93	0.7
3361.2	2.97947	0.93	0.7	3381.2	2.95888	0.93	0.7	3401.2	2.93760	0.93	0.7	3421.2	2.91679	0.93	0.7	3441.2	2.89650	0.93	0.7
3361.4	2.97937	0.93	0.7	3381.4	2.95880	0.93	0.7	3401.4	2.93752	0.93	0.7	3421.4	2.91671	0.93	0.7	3441.4	2.89642	0.93	0.7
3361.6	2.97927	0.93	0.7	3381.6	2.95872	0.93	0.7	3401.6	2.93744	0.93	0.7	3421.6							

Table 5-2 (Cont'd)

[illegible]

Table 5-3 $\int A(\nu) d\nu$

Wm. No.	30	31	Wm. No.	30	31	Wm. No.	30	31	Wm. No.	30	31	Wm. No.	30	31
$\rho(\text{atm})$	8.42 $\times 10^{-1}$	8.42 $\times 10^{-1}$	$\rho(\text{atm})$	8.42 $\times 10^{-1}$	8.42 $\times 10^{-1}$	$\rho(\text{atm})$	8.42 $\times 10^{-1}$	8.42 $\times 10^{-1}$	$\rho(\text{atm})$	8.42 $\times 10^{-1}$	8.42 $\times 10^{-1}$	$\rho(\text{atm})$	8.42 $\times 10^{-1}$	8.42 $\times 10^{-1}$
$\rho_s(\text{atm})$	5.01 $\times 10^0$	1.001 $\times 10^0$	$\rho_s(\text{atm})$	5.01 $\times 10^0$	1.001 $\times 10^0$	$\rho_s(\text{atm})$	5.01 $\times 10^0$	1.001 $\times 10^0$	$\rho_s(\text{atm})$	5.01 $\times 10^0$	1.001 $\times 10^0$	$\rho_s(\text{atm})$	5.01 $\times 10^0$	1.001 $\times 10^0$
$\nu(\text{cm}^{-1})$	2.01 $\times 10^{-2}$	2.01 $\times 10^{-2}$	$\nu(\text{cm}^{-1})$	2.01 $\times 10^{-2}$	2.01 $\times 10^{-2}$	$\nu(\text{cm}^{-1})$	2.01 $\times 10^{-2}$	2.01 $\times 10^{-2}$	$\nu(\text{cm}^{-1})$	2.01 $\times 10^{-2}$	2.01 $\times 10^{-2}$	$\nu(\text{cm}^{-1})$	2.01 $\times 10^{-2}$	2.01 $\times 10^{-2}$
ν	$\nu \cdot 2900$	$\nu \cdot 2900$	ν	$\nu \cdot 2900$	$\nu \cdot 2900$	ν	$\nu \cdot 2900$	$\nu \cdot 2900$	ν	$\nu \cdot 2900$	$\nu \cdot 2900$	ν	$\nu \cdot 2900$	$\nu \cdot 2900$
2700.0	0.000	0.000	3050.0	7.607	7.972	3110.0	19.930	19.967	3170.0	26.316	26.277	3230.0	36.236	36.413
2700.5	0.001	0.000	3050.5	7.609	8.035	3110.5	19.934	19.957	3170.5	26.360	26.267	3230.5	36.164	36.527
2701.0	0.000	0.000	3051.0	7.601	8.089	3111.0	19.946	19.955	3171.0	26.398	26.266	3231.0	36.267	36.537
2701.5	0.000	0.000	3051.5	7.601	8.140	3111.5	19.939	19.955	3171.5	26.431	26.267	3231.5	36.355	36.538
2702.0	0.000	0.000	3052.0	7.607	8.191	3112.0	19.931	19.961	3172.0	26.442	26.277	3232.0	36.433	36.535
2702.5	0.000	0.000	3052.5	7.607	8.249	3112.5	19.930	19.971	3172.5	26.493	26.290	3232.5	36.513	36.541
2703.0	0.000	0.000	3053.0	7.604	8.286	3113.0	19.931	19.981	3173.0	26.543	26.294	3233.0	36.580	36.546
2703.5	0.000	0.000	3053.5	7.604	8.338	3113.5	19.931	19.989	3173.5	26.593	26.298	3233.5	36.641	36.549
2704.0	0.000	0.000	3054.0	7.600	8.394	3114.0	19.931	19.998	3174.0	26.643	26.302	3234.0	36.699	36.552
2704.5	0.000	0.000	3054.5	7.600	8.457	3114.5	19.931	20.006	3174.5	26.693	26.307	3234.5	36.753	36.553
2705.0	0.000	0.000	3055.0	7.600	8.515	3115.0	19.931	20.014	3175.0	26.743	26.311	3235.0	36.802	36.557
2705.5	0.000	0.000	3055.5	7.600	8.578	3115.5	19.931	20.022	3175.5	26.793	26.315	3235.5	36.846	36.560
2706.0	0.000	0.000	3056.0	7.600	8.641	3116.0	19.931	20.030	3176.0	26.843	26.319	3236.0	36.885	36.563
2706.5	0.000	0.000	3056.5	7.600	8.704	3116.5	19.931	20.038	3176.5	26.893	26.323	3236.5	36.923	36.566
2707.0	0.000	0.000	3057.0	7.600	8.767	3117.0	19.931	20.046	3177.0	26.943	26.327	3237.0	36.959	36.569
2707.5	0.000	0.000	3057.5	7.600	8.830	3117.5	19.931	20.054	3177.5	26.993	26.331	3237.5	36.995	36.572
2708.0	0.000	0.000	3058.0	7.600	8.893	3118.0	19.931	20.062	3178.0	27.043	26.335	3238.0	37.031	36.575
2708.5	0.000	0.000	3058.5	7.600	8.956	3118.5	19.931	20.070	3178.5	27.093	26.339	3238.5	37.067	36.578
2709.0	0.000	0.000	3059.0	7.600	9.019	3119.0	19.931	20.078	3179.0	27.143	26.343	3239.0	37.103	36.581
2709.5	0.000	0.000	3059.5	7.600	9.082	3119.5	19.931	20.086	3179.5	27.193	26.347	3239.5	37.139	36.584
2710.0	0.000	0.000	3060.0	7.600	9.145	3120.0	19.931	20.094	3180.0	27.243	26.351	3240.0	37.175	36.587
2710.5	0.000	0.000	3060.5	7.600	9.208	3120.5	19.931	20.102	3180.5	27.293	26.355	3240.5	37.211	36.590
2711.0	0.000	0.000	3061.0	7.600	9.271	3121.0	19.931	20.110	3181.0	27.343	26.359	3241.0	37.247	36.593
2711.5	0.000	0.000	3061.5	7.600	9.334	3121.5	19.931	20.118	3181.5	27.393	26.363	3241.5	37.283	36.596
2712.0	0.000	0.000	3062.0	7.600	9.397	3122.0	19.931	20.126	3182.0	27.443	26.367	3242.0	37.319	36.599
2712.5	0.000	0.000	3062.5	7.600	9.460	3122.5	19.931	20.134	3182.5	27.493	26.371	3242.5	37.355	36.602
2713.0	0.000	0.000	3063.0	7.600	9.523	3123.0	19.931	20.142	3183.0	27.543	26.375	3243.0	37.391	36.605
2713.5	0.000	0.000	3063.5	7.600	9.586	3123.5	19.931	20.150	3183.5	27.593	26.379	3243.5	37.427	36.608
2714.0	0.000	0.000	3064.0	7.600	9.649	3124.0	19.931	20.158	3184.0	27.643	26.383	3244.0	37.463	36.611
2714.5	0.000	0.000	3064.5	7.600	9.712	3124.5	19.931	20.166	3184.5	27.693	26.387	3244.5	37.499	36.614
2715.0	0.000	0.000	3065.0	7.600	9.775	3125.0	19.931	20.174	3185.0	27.743	26.391	3245.0	37.535	36.617
2715.5	0.000	0.000	3065.5	7.600	9.838	3125.5	19.931	20.182	3185.5	27.793	26.395	3245.5	37.571	36.620
2716.0	0.000	0.000	3066.0	7.600	9.901	3126.0	19.931	20.190	3186.0	27.843	26.399	3246.0	37.607	36.623
2716.5	0.000	0.000	3066.5	7.600	9.964	3126.5	19.931	20.198	3186.5	27.893	26.403	3246.5	37.643	36.626
2717.0	0.000	0.000	3067.0	7.600	10.027	3127.0	19.931	20.206	3187.0	27.943	26.407	3247.0	37.679	36.629
2717.5	0.000	0.000	3067.5	7.600	10.090	3127.5	19.931	20.214	3187.5	27.993	26.411	3247.5	37.715	36.632
2718.0	0.000	0.000	3068.0	7.600	10.153	3128.0	19.931	20.222	3188.0	28.043	26.415	3248.0	37.751	36.635
2718.5	0.000	0.000	3068.5	7.600	10.216	3128.5	19.931	20.230	3188.5	28.093	26.419	3248.5	37.787	36.638
2719.0	0.000	0.000	3069.0	7.600	10.279	3129.0	19.931	20.238	3189.0	28.143	26.423	3249.0	37.823	36.641
2719.5	0.000	0.000	3069.5	7.600	10.342	3129.5	19.931	20.246	3189.5	28.193	26.427	3249.5	37.859	36.644
2720.0	0.000	0.000	3070.0	7.600	10.405	3130.0	19.931	20.254	3190.0	28.243	26.431	3250.0	37.895	36.647
2720.5	0.000	0.000	3070.5	7.600	10.468	3130.5	19.931	20.262	3190.5	28.293	26.435	3250.5	37.931	36.650
2721.0	0.000	0.000	3071.0	7.600	10.531	3131.0	19.931	20.270	3191.0	28.343	26.439	3251.0	37.967	36.653
2721.5	0.000	0.000	3071.5	7.600	10.594	3131.5	19.931	20.278	3191.5	28.393	26.443	3251.5	38.003	36.656
2722.0	0.000	0.000	3072.0	7.600	10.657	3132.0	19.931	20.286	3192.0	28.443	26.447	3252.0	38.039	36.659
2722.5	0.000	0.000	3072.5	7.600	10.720	3132.5	19.931	20.294	3192.5	28.493	26.451	3252.5	38.075	36.662
2723.0	0.000	0.000	3073.0	7.600	10.783	3133.0	19.931	20.302	3193.0	28.543	26.455	3253.0	38.111	36.665
2723.5	0.000	0.000	3073.5	7.600	10.846	3133.5	19.931	20.310	3193.5	28.593	26.459	3253.5	38.147	36.668
2724.0	0.000	0.000	3074.0	7.600	10.909	3134.0	19.931	20.318	3194.0	28.643	26.463	3254.0	38.183	36.671
2724.5	0.000	0.000	3074.5	7.600	10.972	3134.5	19.931	20.326	3194.5	28.693	26.467	3254.5	38.219	36.674
2725.0	0.000	0.000	3075.0	7.600	11.035	3135.0	19.931	20.334	3195.0	28.743	26.471	3255.0	38.255	36.677
2725.5	0.000	0.000	3075.5	7.600	11.098	3135.5	19.931	20.342	3195.5	28.793	26.475	3255.5	38.291	36.680
2726.0	0.000	0.000	3076.0	7.600	11.161	3136.0	19.931	20.350	3196.0	28.843	26.479	3256.0	38.327	36.683
2726.5	0.000	0.000	3076.5	7.600	11.224	3136.5	19.931	20.358	3196.5	28.893	26.483	3256.5	38.363	36.686
2727.0	0.000	0.000	3077.0	7.600	11.287	3137.0	19.931	20.366	3197.0	28.943	26.487	3257.0	38.399	36.689
2727.5	0.000	0.000	3077.5	7.600	11.350	3137.5	19.931	20.374	3197.5	28.993	26.491	3257.5	38.435	36.692
2728.0	0.000	0.000	3078.0	7.600	11.413	3138.0	19.931	20.382	3198.0	29.043	26.495	3258.0	38.471	36.695
2728.5	0.000	0.000	3078.5	7.600	11.476	3138.5	19.931	20.390	3198.5	29.093	26.499	3258.5	38.507	36.698
2729.0	0.000	0.000	3079.0	7.600	11.539	3139.0	19.931	20.398	3199.0	29.143	26.503	3259.0	38.543	36.701
2729.5	0.000	0.000	3079.5	7.600	11.602	3139.5	19.931	20.406	3199.5	29.193	26.507	3259.5	38.579	36.704
2730.0	0.000	0.000	3080.0	7.600	11.665	3140.0	19.931	20.414	3200.0	29.243	26.511	3260.0	38.615	36.707
2730.5	0.000	0.000	3080.5	7.600	11.728	3140.5	19.931	20.422	3200.5	29.293	26.515	3260.5	38.651	36.710
2731.0	0.000	0.000	3081.0	7.600	11.791	3141.0	19.931	20.430	3201.0	29.343	26.519	3261.0	38.687	36.713
2731.5	0.000	0.000	3081.5	7.600	11.854	3141.5	19.931	20.438	3201.5	29.393	26.523	3261.5	38.723	36.716
2732.0	0.000	0.000	3082.0	7.600	11.917	3142.0	19.931	20.446	3202.0	29.443	26.527	3262.0	38.759	36.719
2732.5	0.000	0.000	3082.5	7.600	11.980	3142.5	19.931	20.454	3202.5	29.493	26.531	3262.5	38.795	36.

Table 5-3 $\int A(\nu) d\nu$ (cont'd)

λ	λ	λ	λ	λ	λ	λ	λ	λ	λ
Å	Å	Å	Å	Å	Å	Å	Å	Å	Å
3700.0	47.224	51.073	3700.0	50.784	52.022	3700.0	50.784	52.022	3700.0
3700.5	47.225	51.074	3700.5	50.785	52.023	3700.5	50.785	52.023	3700.5
3701.0	47.226	51.075	3701.0	50.786	52.024	3701.0	50.786	52.024	3701.0
3701.5	47.227	51.076	3701.5	50.787	52.025	3701.5	50.787	52.025	3701.5
3702.0	47.228	51.077	3702.0	50.788	52.026	3702.0	50.788	52.026	3702.0
3702.5	47.229	51.078	3702.5	50.789	52.027	3702.5	50.789	52.027	3702.5
3703.0	47.230	51.079	3703.0	50.790	52.028	3703.0	50.790	52.028	3703.0
3703.5	47.231	51.080	3703.5	50.791	52.029	3703.5	50.791	52.029	3703.5
3704.0	47.232	51.081	3704.0	50.792	52.030	3704.0	50.792	52.030	3704.0
3704.5	47.233	51.082	3704.5	50.793	52.031	3704.5	50.793	52.031	3704.5
3705.0	47.234	51.083	3705.0	50.794	52.032	3705.0	50.794	52.032	3705.0
3705.5	47.235	51.084	3705.5	50.795	52.033	3705.5	50.795	52.033	3705.5
3706.0	47.236	51.085	3706.0	50.796	52.034	3706.0	50.796	52.034	3706.0
3706.5	47.237	51.086	3706.5	50.797	52.035	3706.5	50.797	52.035	3706.5
3707.0	47.238	51.087	3707.0	50.798	52.036	3707.0	50.798	52.036	3707.0
3707.5	47.239	51.088	3707.5	50.799	52.037	3707.5	50.799	52.037	3707.5
3708.0	47.240	51.089	3708.0	50.800	52.038	3708.0	50.800	52.038	3708.0
3708.5	47.241	51.090	3708.5	50.801	52.039	3708.5	50.801	52.039	3708.5
3709.0	47.242	51.091	3709.0	50.802	52.040	3709.0	50.802	52.040	3709.0
3709.5	47.243	51.092	3709.5	50.803	52.041	3709.5	50.803	52.041	3709.5
3710.0	47.244	51.093	3710.0	50.804	52.042	3710.0	50.804	52.042	3710.0
3710.5	47.245	51.094	3710.5	50.805	52.043	3710.5	50.805	52.043	3710.5
3711.0	47.246	51.095	3711.0	50.806	52.044	3711.0	50.806	52.044	3711.0
3711.5	47.247	51.096	3711.5	50.807	52.045	3711.5	50.807	52.045	3711.5
3712.0	47.248	51.097	3712.0	50.808	52.046	3712.0	50.808	52.046	3712.0
3712.5	47.249	51.098	3712.5	50.809	52.047	3712.5	50.809	52.047	3712.5
3713.0	47.250	51.099	3713.0	50.810	52.048	3713.0	50.810	52.048	3713.0
3713.5	47.251	51.100	3713.5	50.811	52.049	3713.5	50.811	52.049	3713.5
3714.0	47.252	51.101	3714.0	50.812	52.050	3714.0	50.812	52.050	3714.0
3714.5	47.253	51.102	3714.5	50.813	52.051	3714.5	50.813	52.051	3714.5
3715.0	47.254	51.103	3715.0	50.814	52.052	3715.0	50.814	52.052	3715.0
3715.5	47.255	51.104	3715.5	50.815	52.053	3715.5	50.815	52.053	3715.5
3716.0	47.256	51.105	3716.0	50.816	52.054	3716.0	50.816	52.054	3716.0
3716.5	47.257	51.106	3716.5	50.817	52.055	3716.5	50.817	52.055	3716.5
3717.0	47.258	51.107	3717.0	50.818	52.056	3717.0	50.818	52.056	3717.0
3717.5	47.259	51.108	3717.5	50.819	52.057	3717.5	50.819	52.057	3717.5
3718.0	47.260	51.109	3718.0	50.820	52.058	3718.0	50.820	52.058	3718.0
3718.5	47.261	51.110	3718.5	50.821	52.059	3718.5	50.821	52.059	3718.5
3719.0	47.262	51.111	3719.0	50.822	52.060	3719.0	50.822	52.060	3719.0
3719.5	47.263	51.112	3719.5	50.823	52.061	3719.5	50.823	52.061	3719.5
3720.0	47.264	51.113	3720.0	50.824	52.062	3720.0	50.824	52.062	3720.0
3720.5	47.265	51.114	3720.5	50.825	52.063	3720.5	50.825	52.063	3720.5
3721.0	47.266	51.115	3721.0	50.826	52.064	3721.0	50.826	52.064	3721.0
3721.5	47.267	51.116	3721.5	50.827	52.065	3721.5	50.827	52.065	3721.5
3722.0	47.268	51.117	3722.0	50.828	52.066	3722.0	50.828	52.066	3722.0
3722.5	47.269	51.118	3722.5	50.829	52.067	3722.5	50.829	52.067	3722.5
3723.0	47.270	51.119	3723.0	50.830	52.068	3723.0	50.830	52.068	3723.0
3723.5	47.271	51.120	3723.5	50.831	52.069	3723.5	50.831	52.069	3723.5
3724.0	47.272	51.121	3724.0	50.832	52.070	3724.0	50.832	52.070	3724.0
3724.5	47.273	51.122	3724.5	50.833	52.071	3724.5	50.833	52.071	3724.5
3725.0	47.274	51.123	3725.0	50.834	52.072	3725.0	50.834	52.072	3725.0
3725.5	47.275	51.124	3725.5	50.835	52.073	3725.5	50.835	52.073	3725.5
3726.0	47.276	51.125	3726.0	50.836	52.074	3726.0	50.836	52.074	3726.0
3726.5	47.277	51.126	3726.5	50.837	52.075	3726.5	50.837	52.075	3726.5
3727.0	47.278	51.127	3727.0	50.838	52.076	3727.0	50.838	52.076	3727.0
3727.5	47.279	51.128	3727.5	50.839	52.077	3727.5	50.839	52.077	3727.5
3728.0	47.280	51.129	3728.0	50.840	52.078	3728.0	50.840	52.078	3728.0
3728.5	47.281	51.130	3728.5	50.841	52.079	3728.5	50.841	52.079	3728.5
3729.0	47.282	51.131	3729.0	50.842	52.080	3729.0	50.842	52.080	3729.0
3729.5	47.283	51.132	3729.5	50.843	52.081	3729.5	50.843	52.081	3729.5
3730.0	47.284	51.133	3730.0	50.844	52.082	3730.0	50.844	52.082	3730.0
3730.5	47.285	51.134	3730.5	50.845	52.083	3730.5	50.845	52.083	3730.5
3731.0	47.286	51.135	3731.0	50.846	52.084	3731.0	50.846	52.084	3731.0
3731.5	47.287	51.136	3731.5	50.847	52.085	3731.5	50.847	52.085	3731.5
3732.0	47.288	51.137	3732.0	50.848	52.086	3732.0	50.848	52.086	3732.0
3732.5	47.289	51.138	3732.5	50.849	52.087	3732.5	50.849	52.087	3732.5
3733.0	47.290	51.139	3733.0	50.850	52.088	3733.0	50.850	52.088	3733.0
3733.5	47.291	51.140	3733.5	50.851	52.089	3733.5	50.851	52.089	3733.5
3734.0	47.292	51.141	3734.0	50.852	52.090	3734.0	50.852	52.090	3734.0
3734.5	47.293	51.142	3734.5	50.853	52.091	3734.5	50.853	52.091	3734.5
3735.0	47.294	51.143	3735.0	50.854	52.092	3735.0	50.854	52.092	3735.0
3735.5	47.295	51.144	3735.5	50.855	52.093	3735.5	50.855	52.093	3735.5
3736.0	47.296	51.145	3736.0	50.856	52.094	3736.0	50.856	52.094	3736.0
3736.5	47.297	51.146	3736.5	50.857	52.095	3736.5	50.857	52.095	3736.5
3737.0	47.298	51.147	3737.0	50.858	52.096	3737.0	50.858	52.096	3737.0
3737.5	47.299	51.148	3737.5	50.859	52.097	3737.5	50.859	52.097	3737.5
3738.0	47.300	51.149	3738.0	50.860	52.098	3738.0	50.860	52.098	3738.0
3738.5	47.301	51.150	3738.5	50.861	52.099	3738.5	50.861	52.099	3738.5
3739.0	47.302	51.151	3739.0	50.862	52.100	3739.0	50.862	52.100	3739.0
3739.5	47.303	51.152	3739.5	50.863	52.101	3739.5	50.863	52.101	3739.5
3740.0	47.304	51.153	3740.0	50.864	52.102	3740.0	50.864	52.102	3740.0
3740.5	47.305	51.154	3740.5	50.865	52.103	3740.5	50.865	52.103	3740.5
3741.0	47.306	51.155	3741.0	50.866	52.104	3741.0	50.866	52.104	3741.0
3741.5	47.307	51.156	3741.5	50.867	52.105	3741.5	50.867	52.105	3741.5
3742.0	47.308	51.157	3742.0	50.868	52.106	3742.0	50.868	52.106	3742.0
3742.5	47.309	51.158	3742.5	50.869	52.107	3742.5	50.869	52.107	3742.5
3743.0	47.310	51.159	3743.0	50.870	52.108	3743.0	50.870	52.108	3743.0
3743.5	47.311	51.160	3743.5	50.871	52.109	3743.5	50.871	52.109	3743.5
3744.0	47.312	51.161	3744.0	50.872	52.110	3744.0	50.872	52.110	3744.0
3744.5	47.313	51.162	3744.5	50.873	52.111	3744.5	50.873	52.111	3744.5
3745.0	47.314	51.163	3745.0	50.874	52.112	3745.0	50.874	52.112	3745.0
3745.5	47.315	51.164	3745.5	50.875	52.113	3745.5	50.875	52.113	3745.5
3746.0	47.316	51.165	3746.0	50.876	52.114	3746.0	50.876	52.114	3746.0
3746.5	47.317	51.166	3746.5	50.877	52.115	3746.5	50.877	52.115	3746.5
3747.0	47.318	51.167	3747.0	50.878	52.116	3747.0	50.878	52.116	3747.0
3747.5	47.319	51.168	3747.5	50.879	52.117	3747.5	50.879	52.117	3747.5
3748.0	47.320	51.169	3748.0	50.880	52.118	3748.0	50.880	52.118	3748.0
3748.5	47.321	51.170	3748.5	50.881	52.119	3748.5	50.881	52.119	3748.5
3749.0	47.322	51.171	3749.0	50.882	52.120	3749.0	50.882	52.120	3749.0
3749.5	47.323	51.172	3749.5	50.883	52.121	3749.5	50.883	52.121	3749.5
3750.0	47.324	51.173	3750.0	50.884	52.122	3750.0	50.884	52.122	3750.0
3750.5	47.325	51.174	3750.5	50.885	52.123	3750.5	50.885	52.123	3750.5
3751.0	47.326	51.175	3751.0	50.886	52.124	3751.0	50.886	52.124	3751.0
3751.5	47.327	51.176	3751.5	50.887	52.125	3751.5	50.887	52.125	3751.5
3752.0	47.328	51.177	3752.0	50.888	5				

Table 5-4 $\frac{1}{u} \int_z^{\infty} \ln T(v) dv$

[illegible]

Table 5-5

Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32
$p(\text{atm})$	8.29×10^{-9}	$p(\text{atm})$	8.29×10^{-9}	$p(\text{atm})$	8.29×10^{-9}	$p(\text{atm})$	8.29×10^{-9}	$p(\text{atm})$	8.29×10^{-9}	$p(\text{atm})$	8.29×10^{-9}	$p(\text{atm})$	8.29×10^{-9}
$P_c(\text{atm})$	1.001×10^1	$P_c(\text{atm})$	1.001×10^1	$P_c(\text{atm})$	1.001×10^1	$P_c(\text{atm})$	1.001×10^1	$P_c(\text{atm})$	1.001×10^1	$P_c(\text{atm})$	1.001×10^1	$P_c(\text{atm})$	1.001×10^1
$u(\text{gm/cm}^2)$	2.56×10^{-7}	$u(\text{gm/cm}^2)$	2.56×10^{-7}	$u(\text{gm/cm}^2)$	2.56×10^{-7}	$u(\text{gm/cm}^2)$	2.56×10^{-7}	$u(\text{gm/cm}^2)$	2.56×10^{-7}	$u(\text{gm/cm}^2)$	2.56×10^{-7}	$u(\text{gm/cm}^2)$	2.56×10^{-7}
λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)	λ (micron)
3430.0	2.91345	97.9	3450.0	2.89859	96.5	3470.0	2.88384	94.9	3490.0	2.86933	93.0	3510.0	2.85500
3430.2	2.91329	97.9	3450.2	2.89843	96.5	3470.2	2.88368	94.9	3490.2	2.86917	93.0	3510.2	2.85484
3430.4	2.91311	97.9	3450.4	2.89825	96.5	3470.4	2.88351	94.9	3490.4	2.86900	93.0	3510.4	2.85466
3430.6	2.91293	97.9	3450.6	2.89807	96.5	3470.6	2.88334	94.9	3490.6	2.86883	93.0	3510.6	2.85448
3430.8	2.91277	97.2	3450.8	2.89790	97.5	3470.8	2.88318	94.7	3490.8	2.86867	92.2	3510.8	2.85431
3431.0	2.91260	96.9	3451.0	2.89771	97.8	3471.0	2.88301	94.6	3491.0	2.86851	92.0	3511.0	2.85415
3431.2	2.91243	96.7	3451.2	2.89754	98.1	3471.2	2.88285	94.9	3491.2	2.86834	91.7	3511.2	2.85398
3431.4	2.91226	96.5	3451.4	2.89737	98.1	3471.4	2.88268	94.8	3491.4	2.86818	91.5	3511.4	2.85381
3431.6	2.91209	97.1	3451.6	2.89721	98.4	3471.6	2.88252	94.9	3491.6	2.86802	91.1	3511.6	2.85364
3431.8	2.91192	97.0	3451.8	2.89704	98.6	3471.8	2.88235	94.9	3491.8	2.86785	91.5	3511.8	2.85348
3432.0	2.91175	97.2	3452.0	2.89687	98.7	3472.0	2.88218	99.1	3492.0	2.86768	91.3	3512.0	2.85331
3432.2	2.91158	97.5	3452.2	2.89670	98.9	3472.2	2.88202	99.1	3492.2	2.86752	91.0	3512.2	2.85314
3432.4	2.91141	97.4	3452.4	2.89653	98.8	3472.4	2.88185	99.1	3492.4	2.86736	90.2	3512.4	2.85297
3432.6	2.91124	97.4	3452.6	2.89637	98.9	3472.6	2.88169	99.1	3492.6	2.86720	90.2	3512.6	2.85281
3432.8	2.91107	97.7	3452.8	2.89620	98.9	3472.8	2.88152	98.7	3492.8	2.86703	90.1	3512.8	2.85264
3433.0	2.91090	97.7	3453.0	2.89603	98.9	3473.0	2.88136	98.6	3493.0	2.86687	90.1	3513.0	2.85248
3433.2	2.91073	98.0	3453.2	2.89586	98.9	3473.2	2.88119	98.2	3493.2	2.86670	90.1	3513.2	2.85231
3433.4	2.91056	98.0	3453.4	2.89570	98.9	3473.4	2.88102	98.3	3493.4	2.86654	90.5	3513.4	2.85214
3433.6	2.91039	98.0	3453.6	2.89553	99.0	3473.6	2.88085	97.9	3493.6	2.86638	90.7	3513.6	2.85197
3433.8	2.91022	98.2	3453.8	2.89536	98.9	3473.8	2.88068	97.7	3493.8	2.86621	91.5	3513.8	2.85180
3434.0	2.91005	98.1	3454.0	2.89519	99.0	3474.0	2.88051	97.1	3494.0	2.86605	92.0	3514.0	2.85163
3434.2	2.90988	98.4	3454.2	2.89502	99.1	3474.2	2.88034	96.7	3494.2	2.86588	91.7	3514.2	2.85146
3434.4	2.90971	98.4	3454.4	2.89485	99.1	3474.4	2.88017	96.0	3494.4	2.86571	91.2	3514.4	2.85129
3434.6	2.90954	98.6	3454.6	2.89468	99.0	3474.6	2.88000	95.4	3494.6	2.86554	91.3	3514.6	2.85112
3434.8	2.90937	98.7	3454.8	2.89452	99.0	3474.8	2.87983	94.7	3494.8	2.86537	91.4	3514.8	2.85095
3435.0	2.90920	98.6	3455.0	2.89435	99.0	3475.0	2.87966	94.3	3495.0	2.86520	91.5	3515.0	2.85078
3435.2	2.90903	98.7	3455.2	2.89418	99.0	3475.2	2.87949	94.2	3495.2	2.86503	91.6	3515.2	2.85061
3435.4	2.90886	98.5	3455.4	2.89401	98.8	3475.4	2.87932	94.7	3495.4	2.86486	91.8	3515.4	2.85044
3435.6	2.90869	98.6	3455.6	2.89384	98.5	3475.6	2.87915	95.4	3495.6	2.86469	91.5	3515.6	2.85027
3435.8	2.90852	98.6	3455.8	2.89367	98.5	3475.8	2.87898	96.0	3495.8	2.86452	91.3	3515.8	2.85010
3436.0	2.90835	98.1	3456.0	2.89350	98.3	3476.0	2.87881	96.5	3496.0	2.86435	91.3	3516.0	2.84993
3436.2	2.90818	98.1	3456.2	2.89333	98.5	3476.2	2.87864	97.1	3496.2	2.86418	90.8	3516.2	2.84976
3436.4	2.90801	98.0	3456.4	2.89316	98.6	3476.4	2.87847	97.4	3496.4	2.86401	90.5	3516.4	2.84959
3436.6	2.90784	97.8	3456.6	2.89299	98.5	3476.6	2.87830	97.6	3496.6	2.86384	90.3	3516.6	2.84942
3436.8	2.90767	98.0	3456.8	2.89282	98.7	3476.8	2.87813	97.9	3496.8	2.86367	90.2	3516.8	2.84925
3437.0	2.90750	98.2	3457.0	2.89265	98.6	3477.0	2.87796	98.3	3497.0	2.86350	90.7	3517.0	2.84908
3437.2	2.90733	98.3	3457.2	2.89248	98.6	3477.2	2.87779	98.2	3497.2	2.86333	90.6	3517.2	2.84891
3437.4	2.90716	98.1	3457.4	2.89231	98.7	3477.4	2.87762	97.2	3497.4	2.86316	92.5	3517.4	2.84874
3437.6	2.90699	98.1	3457.6	2.89214	98.9	3477.6	2.87745	98.3	3497.6	2.86299	93.5	3517.6	2.84857
3437.8	2.90682	98.1	3457.8	2.89197	99.0	3477.8	2.87728	98.2	3497.8	2.86282	94.1	3517.8	2.84840
3438.0	2.90665	97.9	3458.0	2.89180	98.8	3478.0	2.87711	97.9	3498.0	2.86265	94.7	3518.0	2.84823
3438.2	2.90648	97.8	3458.2	2.89163	98.6	3478.2	2.87694	97.8	3498.2	2.86248	95.2	3518.2	2.84806
3438.4	2.90631	97.5	3458.4	2.89146	97.8	3478.4	2.87677	97.7	3498.4	2.86231	95.2	3518.4	2.84789
3438.6	2.90614	97.3	3458.6	2.89129	97.7	3478.6	2.87660	97.4	3498.6	2.86214	95.5	3518.6	2.84772
3438.8	2.90597	97.3	3458.8	2.89112	96.8	3478.8	2.87643	97.3	3498.8	2.86197	95.4	3518.8	2.84755
3439.0	2.90580	97.4	3459.0	2.89095	97.3	3479.0	2.87626	97.0	3499.0	2.86180	95.3	3519.0	2.84738
3439.2	2.90563	97.7	3459.2	2.89078	97.8	3479.2	2.87609	97.0	3499.2	2.86163	94.9	3519.2	2.84721
3439.4	2.90546	97.7	3459.4	2.89061	98.2	3479.4	2.87592	97.4	3499.4	2.86146	94.1	3519.4	2.84704
3439.6	2.90529	97.6	3459.6	2.89044	98.3	3479.6	2.87575	96.7	3499.6	2.86129	93.5	3519.6	2.84687
3439.8	2.90512	97.6	3459.8	2.89027	98.0	3479.8	2.87558	93.8	3499.8	2.86112	92.9	3519.8	2.84670
3440.0	2.90495	97.5	3460.0	2.89010	97.9	3480.0	2.87541	92.7	3500.0	2.86095	92.6	3520.0	2.84653
3440.2	2.90478	97.3	3460.2	2.88993	97.3	3480.2	2.87524	90.8	3500.2	2.86078	92.7	3520.2	2.84636
3440.4	2.90461	96.9	3460.4	2.88976	96.6	3480.4	2.87507	88.5	3500.4	2.86061	91.8	3520.4	2.84619
3440.6	2.90444	96.9	3460.6	2.88959	95.5	3480.6	2.87490	87.0	3500.6	2.86044	91.2	3520.6	2.84602
3440.8	2.90427	96.6	3460.8	2.88942	95.0	3480.8	2.87473	86.6	3500.8	2.86027	90.1	3520.8	2.84585
3441.0	2.90410	96.4	3461.0	2.88925	95.3	3481.0	2.87456	87.3	3501.0	2.86010	88.7	3521.0	2.84568
3441.2	2.90393	95.7	3461.2	2.88908	95.0	3481.2	2.87439	88.4	3501.2	2.85993	87.2	3521.2	2.84551
3441.4	2.90376	95.3	3461.4	2.88891	94.9	3481.4	2.87422	88.3	3501.4	2.85976	85.3	3521.4	2.84534
3441.6	2.90359	94.6	3461.6	2.88874	94.5	3481.6	2.87405	88.1	3501.6	2.85959	83.5	3521.6	2.84517
3441.8	2.90342	93.6	3461.8	2.88857	94.2	3481.8	2.87388	86.7	3501.8	2.85942	81.7	3521.8	2.84500
3442.0	2.90325	92.4	3462.0	2.88840	94.0	3482.0	2.87371	85.4	3502.0	2.85925	79.5	3522.0	2.84483
3442.2	2.90308	91.8	3462.2	2.88823	93.6	3482.2	2.87354	83.4	3502.2	2.85908	78.4	3522.2	2.84466
3442.4	2.90291	90.9	3462.4	2.88806	93.3	3482.4	2.87337	81.9	3502.4	2.85891	77.5	3522.4	2.84449
3442.6	2.90274	90.5	3462.6	2.88789	92.8	3482.6	2.87320	83.2	3502.6	2.85874	72.2	3522.6	2.84432
3442.8	2.90257	90.4	3462.8	2.88772	92.7	3482.8	2.87303	86.3	3502.8	2.85857	72.1	3522.8	2.84415
3443.0	2.90240	91.2	3463.0	2.88755	93.1	3483.0	2.87286	88.6	3503.0	2.85840	72.2	3523.0	2.84398
3443.2	2.90223	91.9	3463.2	2.88738	93.7	3483.2	2.87269	90.2	3503.2	2.85823	70.5	3523.2	2.84381
3443.4	2.90206	92.7	3463.4	2.88721	94.7	3483.4	2.87252	91.9	3503.4	2.85806	71.7	3523.4	2.84364
3443.6	2.90189	93.4	3463.6	2.88704	95.1	3483.6	2.87235	92.7	3503.6	2.85789	73.3	3523.6	2.84347
3443.8	2.90172	93.9	3463.8	2.88687	96.5	3483.8	2.87218	93.7	3503.8	2.85772	73.5	3523.8	2.84330
3444.0	2.90155	94.0	3464.0	2.88670	96.9	3484.0	2.87201	94.1	3504.0	2.85755	72.0	3524.0	2.84313
3444.2	2.90138	94.3	3464.2	2.88653	97.5	3484							

Table 5-5 (Cont'd)

Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32		
$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}		
$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1		
$u(\text{gm/cm}^3)$	2.56×10^{-3}	$u(\text{gm/cm}^3)$	2.56×10^{-3}	$u(\text{gm/cm}^3)$	2.56×10^{-3}	$u(\text{gm/cm}^3)$	2.56×10^{-3}	$u(\text{gm/cm}^3)$	2.56×10^{-3}		
λ (microns)	T n 100	λ (microns)	T n 100	λ (microns)	T n 100	λ (microns)	T n 100	λ (microns)	T n 100		
3550.0	2.81490	82.7	3570.0	2.80112	80.4	3590.0	2.78552	43.2	3610.0	2.77008	17.5
3550.2	2.81474	82.4	3570.2	2.80095	80.6	3590.2	2.78536	43.0	3610.2	2.76993	22.0
3550.4	2.81458	82.0	3570.4	2.80081	80.0	3590.4	2.78520	53.7	3610.4	2.76978	26.2
3550.6	2.81443	81.1	3570.6	2.80065	65.5	3590.6	2.78505	57.1	3610.6	2.76962	29.5
3550.8	2.81427	80.2	3570.8	2.80049	67.2	3590.8	2.78489	60.3	3610.8	2.76947	31.7
3551.0	2.81411	79.0	3571.0	2.80034	70.0	3591.0	2.78474	62.5	3611.0	2.76932	32.5
3551.2	2.81395	77.1	3571.2	2.80018	72.3	3591.2	2.78458	64.0	3611.2	2.76916	32.1
3551.4	2.81379	74.7	3571.4	2.80002	74.7	3591.4	2.78443	65.0	3611.4	2.76901	30.3
3551.6	2.81363	71.9	3571.6	2.79987	77.0	3591.6	2.78427	65.6	3611.6	2.76886	27.9
3551.8	2.81347	68.7	3571.8	2.79971	78.3	3591.8	2.78412	65.6	3611.8	2.76870	24.6
3552.0	2.81332	65.7	3572.0	2.79955	79.8	3592.0	2.78396	64.9	3612.0	2.76855	21.2
3552.2	2.81316	63.5	3572.2	2.79940	80.7	3592.2	2.78381	63.4	3612.2	2.76840	17.7
3552.4	2.81300	62.5	3572.4	2.79924	81.2	3592.4	2.78365	61.5	3612.4	2.76824	15.1
3552.6	2.81284	63.3	3572.6	2.79908	81.4	3592.6	2.78350	58.9	3612.6	2.76809	14.2
3552.8	2.81268	65.2	3572.8	2.79893	81.6	3592.8	2.78334	55.6	3612.8	2.76794	14.4
3553.0	2.81252	67.6	3573.0	2.79877	81.3	3593.0	2.78319	52.3	3613.0	2.76778	15.8
3553.2	2.81236	69.6	3573.2	2.79861	81.2	3593.2	2.78303	49.6	3613.2	2.76763	18.5
3553.4	2.81221	70.7	3573.4	2.79846	80.9	3593.4	2.78288	47.9	3613.4	2.76748	21.3
3553.6	2.81205	71.1	3573.6	2.79830	80.7	3593.6	2.78272	47.5	3613.6	2.76732	23.5
3553.8	2.81189	71.2	3573.8	2.79814	80.1	3593.8	2.78257	48.0	3613.8	2.76717	25.1
3554.0	2.81173	72.4	3574.0	2.79799	79.8	3594.0	2.78242	48.7	3614.0	2.76702	25.6
3554.2	2.81157	74.6	3574.2	2.79783	79.4	3594.2	2.78226	49.4	3614.2	2.76686	25.0
3554.4	2.81141	77.8	3574.4	2.79767	79.0	3594.4	2.78211	48.9	3614.4	2.76671	24.5
3554.6	2.81126	80.5	3574.6	2.79752	78.5	3594.6	2.78195	47.5	3614.6	2.76656	24.3
3554.8	2.81110	82.9	3574.8	2.79736	78.5	3594.8	2.78180	44.8	3614.8	2.76640	25.3
3555.0	2.81094	84.5	3575.0	2.79720	78.8	3595.0	2.78164	41.5	3615.0	2.76625	27.1
3555.2	2.81078	85.9	3575.2	2.79705	79.4	3595.2	2.78149	38.4	3615.2	2.76610	29.4
3555.4	2.81062	86.9	3575.4	2.79689	80.0	3595.4	2.78133	36.3	3615.4	2.76595	31.7
3555.6	2.81046	87.6	3575.6	2.79673	80.5	3595.6	2.78118	35.9	3615.6	2.76579	33.7
3555.8	2.81031	88.0	3575.8	2.79658	81.0	3595.8	2.78102	37.4	3615.8	2.76564	35.5
3556.0	2.81015	88.1	3576.0	2.79642	80.6	3596.0	2.78087	40.3	3616.0	2.76549	36.4
3556.2	2.81000	88.1	3576.2	2.79626	80.1	3596.2	2.78071	43.7	3616.2	2.76533	36.5
3556.4	2.80984	87.9	3576.4	2.79611	79.3	3596.4	2.78056	47.2	3616.4	2.76518	35.9
3556.6	2.80968	87.4	3576.6	2.79595	78.5	3596.6	2.78040	50.9	3616.6	2.76503	34.4
3556.8	2.80952	87.1	3576.8	2.79580	77.7	3596.8	2.78025	54.0	3616.8	2.76488	31.7
3557.0	2.80936	86.7	3577.0	2.79564	77.3	3597.0	2.78009	56.4	3617.0	2.76472	28.4
3557.2	2.80920	86.6	3577.2	2.79548	77.2	3597.2	2.77994	57.9	3617.2	2.76457	24.8
3557.4	2.80904	86.4	3577.4	2.79533	77.7	3597.4	2.77979	59.0	3617.4	2.76442	21.2
3557.6	2.80888	86.4	3577.6	2.79517	78.4	3597.6	2.77963	59.0	3617.6	2.76426	18.1
3557.8	2.80872	86.5	3577.8	2.79501	79.3	3597.8	2.77948	58.6	3617.8	2.76411	16.3
3558.0	2.80856	86.5	3578.0	2.79486	79.8	3598.0	2.77932	57.8	3618.0	2.76396	15.4
3558.2	2.80840	86.2	3578.2	2.79470	80.5	3598.2	2.77917	56.9	3618.2	2.76381	15.3
3558.4	2.80824	85.9	3578.4	2.79455	80.6	3598.4	2.77901	56.4	3618.4	2.76365	15.2
3558.6	2.80808	85.2	3578.6	2.79439	80.4	3598.6	2.77886	56.5	3618.6	2.76350	14.7
3558.8	2.80792	84.2	3578.8	2.79423	79.9	3598.8	2.77870	56.8	3618.8	2.76335	13.8
3559.0	2.80776	82.6	3579.0	2.79408	78.9	3599.0	2.77855	57.4	3619.0	2.76319	12.2
3559.2	2.80760	81.0	3579.2	2.79392	77.5	3599.2	2.77840	57.7	3619.2	2.76304	10.6
3559.4	2.80744	78.9	3579.4	2.79376	75.6	3599.4	2.77824	57.9	3619.4	2.76289	9.1
3559.6	2.80728	76.3	3579.6	2.79361	73.4	3599.6	2.77809	57.7	3619.6	2.76274	8.4
3559.8	2.80712	73.5	3579.8	2.79345	71.3	3599.8	2.77793	57.4	3619.8	2.76258	8.5
3560.0	2.80696	70.5	3580.0	2.79330	69.8	3600.0	2.77778	56.8	3620.0	2.76243	9.6
3560.2	2.80680	68.6	3580.2	2.79314	69.6	3600.2	2.77762	56.0	3620.2	2.76228	11.4
3560.4	2.80664	68.0	3580.4	2.79298	71.2	3600.4	2.77747	55.1	3620.4	2.76213	13.8
3560.6	2.80648	68.8	3580.6	2.79283	73.5	3600.6	2.77731	53.9	3620.6	2.76197	16.4
3560.8	2.80632	70.2	3580.8	2.79267	75.7	3600.8	2.77716	53.2	3620.8	2.76182	19.3
3561.0	2.80616	71.7	3581.0	2.79252	77.1	3601.0	2.77701	53.0	3621.0	2.76167	21.8
3561.2	2.80600	72.8	3581.2	2.79236	78.1	3601.2	2.77685	53.5	3621.2	2.76152	24.4
3561.4	2.80584	73.5	3581.4	2.79220	78.8	3601.4	2.77670	55.0	3621.4	2.76136	27.1
3561.6	2.80568	73.3	3581.6	2.79205	78.9	3601.6	2.77654	56.7	3621.6	2.76121	30.3
3561.8	2.80552	72.7	3581.8	2.79189	78.7	3601.8	2.77639	58.6	3621.8	2.76105	33.7
3562.0	2.80536	71.7	3582.0	2.79174	78.5	3602.0	2.77624	60.5	3622.0	2.76090	36.8
3562.2	2.80520	69.9	3582.2	2.79158	77.4	3602.2	2.77608	61.5	3622.2	2.76075	39.5
3562.4	2.80504	68.4	3582.4	2.79142	76.2	3602.4	2.77593	62.2	3622.4	2.76060	42.2
3562.6	2.80488	67.4	3582.6	2.79127	75.3	3602.6	2.77577	62.9	3622.6	2.76045	43.8
3562.8	2.80472	66.9	3582.8	2.79111	74.1	3602.8	2.77562	63.9	3622.8	2.76030	45.4
3563.0	2.80456	65.9	3583.0	2.79096	73.1	3603.0	2.77546	64.9	3623.0	2.76014	46.4
3563.2	2.80440	64.8	3583.2	2.79080	72.0	3603.2	2.77531	65.9	3623.2	2.76000	47.3
3563.4	2.80424	63.2	3583.4	2.79065	70.6	3603.4	2.77516	66.9	3623.4	2.75984	47.8
3563.6	2.80408	61.6	3583.6	2.79049	69.3	3603.6	2.77500	67.7	3623.6	2.75969	48.4
3563.8	2.80392	60.6	3583.8	2.79033	68.4	3603.8	2.77485	68.2	3623.8	2.75953	48.5
3564.0	2.80376	59.5	3584.0	2.79018	67.5	3604.0	2.77469	68.5	3624.0	2.75938	48.5
3564.2	2.80360	58.3	3584.2	2.79002	66.4	3604.2	2.77454	68.6	3624.2	2.75923	48.2
3564.4	2.80344	56.5	3584.4	2.78987	64.8	3604.4	2.77439	68.1	3624.4	2.75908	47.6
3564.6	2.80328	54.4	3584.6	2.78971	62.8	3604.6	2.77423	67.3	3624.6	2.75893	46.6
3564.8	2.80312	51.1	3584.8	2.78956	60.3	3604.8	2.77408	65.9	3624.8	2.75877	45.1
3565.0	2.80296	47.6	3585.0	2.78940	56.7	3605.0	2.77393	64.3	3625.0	2.75862	43.3
3565.2	2.80280	43.2	3585.2	2.78924	52.6	3605.2	2.77377	62.2	3625.2	2.75847	41.3
3565.4	2.80264	38.6	3585.4	2.78909	48.1	3605.4	2.77362	59.8	3625.4	2.75832	38.5
3565.6	2.80248	34.0	3585.6	2.78893	43.4	3605.6	2.77346	56.9	3625.6	2.75816	35.9
3565.8	2.80232	29.9	3585.8	2.78878	37.6	3605.8	2.77331	53.6	3625.8	2.75801	33.0
3566.0	2.80216	26.3	3586.0	2.78862	32.0	3606.0	2.77316	49.8	3626.0	2.75786	30.1
3566.2	2.80200	23.7	3586.2	2.78847	26.8	3606.2	2.77300	45.1	3626.2	2.75771	27.3
3566.4	2.80184	21.1	3586.4	2.78831	22.5	3606.4	2.77285	40.3	3626.4	2.75756	24.7
3566.6	2.80168	20.1	3586.6	2.78816	19.5	3606.6	2.77269	35.5	3626.6	2.75740	22.4
3566.8	2.80152	19.4	3586.8	2.78800	18.0	3606.8	2.77254	31.5	3626.8	2.75725	20.1
3567.0	2.80136	19.1	3587.0	2.78784	17.9	3607.0	2.77239	28.1	3627.0	2.75710	17.5
3567.2	2.80120	19.1	3587.2	2.78769	18.5	3607.2	2.77223				

Table 5-6 $\int A(\nu) d\nu$

Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32
$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}	$p(\text{atm})$	8.29×10^{-3}
$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1	$P_e(\text{atm})$	1.003×10^1
$u(\text{gm/cm}^2)$	2.56×10^{-3}	$u(\text{gm/cm}^2)$	2.56×10^{-3}	$u(\text{gm/cm}^2)$	2.56×10^{-3}	$u(\text{gm/cm}^2)$	2.56×10^{-3}	$u(\text{gm/cm}^2)$	2.56×10^{-3}	$u(\text{gm/cm}^2)$	2.56×10^{-3}
ν (cm^{-1})	$\nu' = 3430$ cm^{-1}	ν (cm^{-1})	$\nu' = 3430$ cm^{-1}	ν (cm^{-1})	$\nu' = 3430$ cm^{-1}	ν (cm^{-1})	$\nu' = 3430$ cm^{-1}	ν (cm^{-1})	$\nu' = 3430$ cm^{-1}	ν (cm^{-1})	$\nu' = 3430$ cm^{-1}
3430.0	0.	3465.0	1.566	3500.0	3.401	3535.0	8.768	3570.0	19.492	3605.0	33.499
3430.5	0.011	3465.5	1.574	3500.5	3.441	3535.5	8.822	3570.5	19.678	3605.5	33.691
3431.0	0.025	3466.0	1.587	3501.0	3.489	3536.0	8.903	3571.0	19.843	3606.0	33.919
3431.5	0.041	3466.5	1.610	3501.5	3.556	3536.5	9.012	3571.5	19.978	3606.5	34.200
3432.0	0.056	3467.0	1.653	3502.0	3.645	3537.0	9.113	3572.0	20.089	3607.0	34.537
3432.5	0.069	3467.5	1.687	3502.5	3.766	3537.5	9.188	3572.5	20.195	3607.5	34.904
3433.0	0.081	3468.0	1.703	3503.0	3.905	3538.0	9.242	3573.0	20.278	3608.0	35.281
3433.5	0.091	3468.5	1.711	3503.5	4.043	3538.5	9.285	3573.5	20.372	3608.5	35.666
3434.0	0.101	3469.0	1.716	3504.0	4.177	3539.0	9.322	3574.0	20.471	3609.0	36.134
3434.5	0.109	3469.5	1.720	3504.5	4.311	3539.5	9.359	3574.5	20.574	3609.5	36.599
3435.0	0.116	3470.0	1.724	3505.0	4.403	3540.0	9.396	3575.0	20.681	3610.0	37.037
3435.5	0.123	3470.5	1.732	3505.5	4.473	3540.5	9.434	3575.5	20.783	3610.5	37.422
3436.0	0.130	3471.0	1.739	3506.0	4.528	3541.0	9.473	3576.0	20.880	3611.0	37.768
3436.5	0.140	3471.5	1.745	3506.5	4.573	3541.5	9.517	3576.5	20.981	3611.5	38.111
3437.0	0.150	3472.0	1.750	3507.0	4.612	3542.0	9.568	3577.0	21.091	3612.0	38.485
3437.5	0.159	3472.5	1.754	3507.5	4.649	3542.5	9.636	3577.5	21.204	3612.5	38.898
3438.0	0.169	3473.0	1.760	3508.0	4.692	3543.0	9.725	3578.0	21.309	3613.0	39.325
3438.5	0.180	3473.5	1.769	3508.5	4.748	3543.5	9.837	3578.5	21.407	3613.5	39.729
3439.0	0.194	3474.0	1.780	3509.0	4.831	3544.0	9.971	3579.0	21.507	3614.0	40.107
3439.5	0.205	3474.5	1.798	3509.5	4.946	3544.5	10.126	3579.5	21.623	3614.5	40.482
3440.0	0.217	3475.0	1.823	3510.0	5.075	3545.0	10.325	3580.0	21.763	3615.0	40.855
3440.5	0.231	3475.5	1.851	3510.5	5.178	3545.5	10.564	3580.5	21.911	3615.5	41.206
3441.0	0.248	3476.0	1.872	3511.0	5.252	3546.0	10.789	3581.0	22.036	3616.0	41.531
3441.5	0.270	3476.5	1.886	3511.5	5.309	3546.5	11.012	3581.5	22.145	3616.5	41.851
3442.0	0.301	3477.0	1.897	3512.0	5.357	3547.0	11.301	3582.0	22.252	3617.0	42.190
3442.5	0.343	3477.5	1.906	3512.5	5.397	3547.5	11.561	3582.5	22.366	3617.5	42.570
3443.0	0.390	3478.0	1.915	3513.0	5.431	3548.0	11.738	3583.0	22.494	3618.0	42.985
3443.5	0.430	3478.5	1.926	3513.5	5.460	3548.5	11.872	3583.5	22.636	3618.5	43.409
3444.0	0.461	3479.0	1.939	3514.0	5.484	3549.0	11.980	3584.0	22.793	3619.0	43.840
3444.5	0.490	3479.5	1.958	3514.5	5.507	3549.5	12.071	3584.5	22.963	3619.5	44.288
3445.0	0.525	3480.0	1.989	3515.0	5.525	3550.0	12.157	3585.0	23.160	3620.0	44.745
3445.5	0.578	3480.5	2.038	3515.5	5.542	3550.5	12.245	3585.5	23.403	3620.5	45.184
3446.0	0.630	3481.0	2.103	3516.0	5.558	3551.0	12.343	3586.0	23.708	3621.0	45.592
3446.5	0.689	3481.5	2.162	3516.5	5.576	3551.5	12.461	3586.5	24.078	3621.5	45.966
3447.0	0.773	3482.0	2.227	3517.0	5.598	3552.0	12.614	3587.0	24.484	3622.0	46.302
3447.5	0.888	3482.5	2.311	3517.5	5.630	3552.5	12.796	3587.5	24.890	3622.5	46.602
3448.0	0.998	3483.0	2.383	3518.0	5.666	3553.0	12.971	3588.0	25.294	3623.0	46.877
3448.5	1.072	3483.5	2.430	3518.5	5.701	3553.5	13.123	3588.5	25.721	3623.5	47.140
3449.0	1.120	3484.0	2.463	3519.0	5.741	3554.0	13.266	3589.0	26.173	3624.0	47.398
3449.5	1.152	3484.5	2.490	3519.5	5.784	3554.5	13.389	3589.5	26.589	3624.5	47.658
3450.0	1.174	3485.0	2.515	3520.0	5.827	3555.0	13.478	3590.0	26.918	3625.0	47.931
3450.5	1.189	3485.5	2.540	3520.5	5.869	3555.5	13.547	3590.5	27.168	3625.5	48.229
3451.0	1.201	3486.0	2.570	3521.0	5.914	3556.0	13.608	3591.0	27.372	3626.0	48.560
3451.5	1.211	3486.5	2.600	3521.5	5.970	3556.5	13.668	3591.5	27.551	3626.5	48.927
3452.0	1.218	3487.0	2.631	3522.0	6.046	3557.0	13.733	3592.0	27.724	3627.0	49.324
3452.5	1.224	3487.5	2.671	3522.5	6.152	3557.5	13.800	3592.5	27.910	3627.5	49.755
3453.0	1.229	3488.0	2.733	3523.0	6.287	3558.0	13.868	3593.0	28.128	3628.0	50.218
3453.5	1.235	3488.5	2.807	3523.5	6.435	3558.5	13.937	3593.5	28.381	3628.5	50.697
3454.0	1.240	3489.0	2.857	3524.0	6.598	3559.0	14.015	3594.0	28.661	3629.0	51.180
3454.5	1.245	3489.5	2.886	3524.5	6.748	3559.5	14.114	3594.5	28.896	3629.5	51.665
3455.0	1.250	3490.0	2.904	3525.0	6.874	3560.0	14.243	3595.0	29.170	3630.0	52.148
3455.5	1.255	3490.5	2.918	3525.5	7.028	3560.5	14.399	3595.5	29.479	3630.5	52.617
3456.0	1.263	3491.0	2.932	3526.0	7.200	3561.0	14.550	3596.0	29.792	3631.0	53.050
3456.5	1.270	3491.5	2.947	3526.5	7.325	3561.5	14.685	3596.5	30.069	3631.5	53.438
3457.0	1.278	3492.0	2.960	3527.0	7.450	3562.0	14.822	3597.0	30.304	3632.0	53.784
3457.5	1.284	3492.5	2.970	3527.5	7.591	3562.5	14.974	3597.5	30.513	3632.5	54.105
3458.0	1.290	3493.0	2.979	3528.0	7.734	3563.0	15.139	3598.0	30.720	3633.0	54.422
3458.5	1.298	3493.5	2.989	3528.5	7.871	3563.5	15.317	3598.5	30.936	3633.5	54.755
3459.0	1.313	3494.0	3.002	3529.0	8.011	3564.0	15.513	3599.0	31.152	3634.0	55.105
3459.5	1.324	3494.5	3.019	3529.5	8.145	3564.5	15.724	3599.5	31.363	3634.5	55.432
3460.0	1.333	3495.0	3.046	3530.0	8.253	3565.0	15.965	3600.0	31.576	3635.0	55.712
3460.5	1.348	3495.5	3.084	3530.5	8.343	3565.5	16.255	3600.5	31.798		
3461.0	1.371	3496.0	3.127	3531.0	8.427	3566.0	16.600	3601.0	32.030		
3461.5	1.396	3496.5	3.173	3531.5	8.500	3566.5	16.984	3601.5	32.260		
3462.0	1.425	3497.0	3.221	3532.0	8.558	3567.0	17.386	3602.0	32.468		
3462.5	1.457	3497.5	3.262	3532.5	8.601	3567.5	17.793	3602.5	32.660		
3463.0	1.493	3498.0	3.292	3533.0	8.636	3568.0	18.221	3603.0	32.842		
3463.5	1.523	3498.5	3.317	3533.5	8.667	3568.5	18.638	3603.5	33.011		
3464.0	1.542	3499.0	3.340	3534.0	8.697	3569.0	18.993	3604.0	33.171		
3464.5	1.555	3499.5	3.366	3534.5	8.729	3569.5	19.272	3604.5	33.329		

Table 5-7 $\frac{1}{u} \int_{\nu}^{\nu} \ln T(\nu) d\nu$

Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32	Sam. No.	32
p(atm)	8.29 $\times 10^{-1}$	p(atm)	8.29 $\times 10^{-1}$	p(atm)	8.29 $\times 10^{-1}$	p(atm)	8.29 $\times 10^{-1}$	p(atm)	8.29 $\times 10^{-1}$
P ₀ (atm)	1.001 $\times 10^1$	P ₀ (atm)	1.001 $\times 10^1$	P ₀ (atm)	1.001 $\times 10^1$	P ₀ (atm)	1.001 $\times 10^1$	P ₀ (atm)	1.001 $\times 10^1$
u(gm/cm ²)	2.56 $\times 10^{-3}$	u(gm/cm ²)	2.56 $\times 10^{-3}$	u(gm/cm ²)	2.56 $\times 10^{-3}$	u(gm/cm ²)	2.56 $\times 10^{-3}$	u(gm/cm ²)	2.56 $\times 10^{-3}$
ν (cm ⁻¹)	$\nu \cdot 3630$ cm ⁻¹	ν (cm ⁻¹)	$\nu \cdot 3630$ cm ⁻¹	ν (cm ⁻¹)	$\nu \cdot 3630$ cm ⁻¹	ν (cm ⁻¹)	$\nu \cdot 3630$ cm ⁻¹	ν (cm ⁻¹)	$\nu \cdot 3630$ cm ⁻¹
3430.0	0.	3480.0	8.126054e+002	3530.0	3.5416230e+003	3580.0	1.0764198e+004	3630.0	3.3377207e+004
3430.5	4.5145764e+000	3480.5	8.3278788e+002	3530.5	3.5805538e+003	3580.5	1.0832912e+004	3630.5	3.3923699e+004
3431.0	1.0034349e+001	3481.0	8.6004762e+002	3531.0	3.6161488e+003	3581.0	1.0899222e+004	3631.0	3.4322813e+004
3431.5	1.6344258e+001	3481.5	8.8468771e+002	3531.5	3.6471109e+003	3581.5	1.0937417e+004	3631.5	3.4616332e+004
3432.0	2.2147514e+001	3482.0	9.1194014e+002	3532.0	3.6711372e+003	3582.0	1.0984172e+004	3632.0	3.4847380e+004
3432.5	2.7266873e+001	3482.5	9.4779431e+002	3532.5	3.6890015e+003	3582.5	1.1035021e+004	3632.5	3.5048545e+004
3433.0	3.2076454e+001	3483.0	9.7861256e+002	3533.0	3.7029359e+003	3583.0	1.1092740e+004	3633.0	3.5244498e+004
3433.5	3.6199627e+001	3483.5	9.9790969e+002	3533.5	3.7154718e+003	3583.5	1.1158120e+004	3633.5	3.5459847e+004
3434.0	3.9967919e+001	3484.0	1.0113420e+003	3534.0	3.7276619e+003	3584.0	1.1231611e+004	3634.0	3.5694737e+004
3434.5	4.3179345e+001	3484.5	1.0220473e+003	3534.5	3.7406955e+003	3584.5	1.1313261e+004	3634.5	3.5903407e+004
3435.0	4.5924961e+001	3485.0	1.0320502e+003	3535.0	3.7565343e+003	3585.0	1.1411105e+004	3635.0	3.6064176e+004
3435.5	4.8703829e+001	3485.5	1.0421935e+003	3535.5	3.7747154e+003	3585.5	1.1514791e+004		
3436.0	5.1548174e+001	3486.0	1.0539653e+003	3536.0	3.8137456e+003	3586.0	1.1727183e+004		
3436.5	5.5339739e+001	3486.5	1.0661643e+003	3536.5	3.8614452e+003	3586.5	1.1952670e+004		
3437.0	5.9368943e+001	3487.0	1.0787259e+003	3537.0	3.9057630e+003	3587.0	1.2320541e+004		
3437.5	6.2918409e+001	3487.5	1.0951094e+003	3537.5	3.9374532e+003	3587.5	1.2647796e+004		
3438.0	6.6725726e+001	3488.0	1.1212299e+003	3538.0	3.9598834e+003	3588.0	1.2948815e+004		
3438.5	7.1295286e+001	3488.5	1.1522788e+003	3538.5	3.9774275e+003	3588.5	1.3349170e+004		
3439.0	7.6635557e+001	3489.0	1.1731209e+003	3539.0	3.9927432e+003	3589.0	1.3805557e+004		
3439.5	8.1236466e+001	3489.5	1.1847316e+003	3539.5	4.0076014e+003	3589.5	1.4144410e+004		
3440.0	8.6022136e+001	3490.0	1.1919565e+003	3540.0	4.0225163e+003	3590.0	1.4376624e+004		
3440.5	9.1012233e+001	3490.5	1.1973232e+003	3540.5	4.0379823e+003	3590.5	1.4513337e+004		
3441.0	9.6249801e+001	3491.0	1.2028101e+003	3541.0	4.0540860e+003	3591.0	1.4615431e+004		
3441.5	1.0703885e+002	3491.5	1.2089344e+003	3541.5	4.0719392e+003	3591.5	1.4702251e+004		
3442.0	1.1958222e+002	3492.0	1.2160852e+003	3542.0	4.0931561e+003	3592.0	1.4785263e+004		
3442.5	1.3685056e+002	3492.5	1.2179015e+003	3542.5	4.1217179e+003	3592.5	1.4876260e+004		
3443.0	1.5607319e+002	3493.0	1.2215843e+003	3543.0	4.1594801e+003	3593.0	1.4988432e+004		
3443.5	1.7210895e+002	3493.5	1.2256132e+003	3543.5	4.2097634e+003	3593.5	1.5126266e+004		
3444.0	1.8484784e+002	3494.0	1.2306327e+003	3544.0	4.2704632e+003	3594.0	1.5270009e+004		
3444.5	1.9655326e+002	3494.5	1.2375228e+003	3544.5	4.3431420e+003	3594.5	1.5409593e+004		
3445.0	2.1086260e+002	3495.0	1.2483060e+003	3545.0	4.4429332e+003	3595.0	1.5564805e+004		
3445.5	2.3251429e+002	3495.5	1.2636149e+003	3545.5	4.5701700e+003	3595.5	1.5753381e+004		
3446.0	2.5410374e+002	3496.0	1.2811954e+003	3546.0	4.6873604e+003	3596.0	1.5946022e+004		
3446.5	2.7843250e+002	3496.5	1.3001645e+003	3546.5	4.8025558e+003	3596.5	1.6104338e+004		
3447.0	3.1474079e+002	3497.0	1.3200614e+003	3547.0	4.9725726e+003	3597.0	1.6228527e+004		
3447.5	3.6598700e+002	3497.5	1.3361789e+003	3547.5	5.1172815e+003	3597.5	1.6334670e+004		
3448.0	4.1419851e+002	3498.0	1.3489820e+003	3548.0	5.2030790e+003	3598.0	1.6439364e+004		
3448.5	4.4572859e+002	3498.5	1.3586990e+003	3548.5	5.2640807e+003	3598.5	1.6549409e+004		
3449.0	4.6547761e+002	3499.0	1.3678571e+003	3549.0	5.3120012e+003	3599.0	1.6660177e+004		
3449.5	4.7841519e+002	3499.5	1.3768898e+003	3549.5	5.3513273e+003	3599.5	1.6767729e+004		
3450.0	4.8716719e+002	3500.0	1.3927051e+003	3550.0	5.3879167e+003	3600.0	1.6876209e+004		
3450.5	4.9320758e+002	3500.5	1.4088116e+003	3550.5	5.4261820e+003	3600.5	1.6990567e+004		
3451.0	4.9811863e+002	3501.0	1.4287241e+003	3551.0	5.4688863e+003	3601.0	1.7112811e+004		
3451.5	5.0197772e+002	3501.5	1.4567162e+003	3551.5	5.5215894e+003	3601.5	1.7230700e+004		
3452.0	5.0485624e+002	3502.0	1.4954125e+003	3552.0	5.5927995e+003	3602.0	1.7338980e+004		
3452.5	5.0712155e+002	3502.5	1.5497263e+003	3552.5	5.681386e+003	3602.5	1.7433567e+004		
3453.0	5.0923218e+002	3503.0	1.6133005e+003	3553.0	5.7859495e+003	3603.0	1.7521799e+004		
3453.5	5.1135307e+002	3503.5	1.6763032e+003	3553.5	5.8367228e+003	3603.5	1.7602663e+004		
3454.0	5.1337727e+002	3504.0	1.7376277e+003	3554.0	5.9026977e+003	3604.0	1.7678011e+004		
3454.5	5.1525521e+002	3504.5	1.7985051e+003	3554.5	5.9575738e+003	3604.5	1.7752462e+004		
3455.0	5.1721117e+002	3505.0	1.8383252e+003	3555.0	5.9961041e+003	3605.0	1.7833264e+004		
3455.5	5.1936827e+002	3505.5	1.8847713e+003	3555.5	6.0254257e+003	3605.5	1.7920291e+004		
3456.0	5.2135944e+002	3506.0	1.890754e+003	3556.0	6.0508193e+003	3606.0	1.8047951e+004		
3456.5	5.2531678e+002	3506.5	1.9090435e+003	3556.5	6.0798328e+003	3606.5	1.8209645e+004		
3457.0	5.2814320e+002	3507.0	1.9248427e+003	3557.0	6.1027313e+003	3607.0	1.8429377e+004		
3457.5	5.3080447e+002	3507.5	1.9401574e+003	3557.5	6.1309825e+003	3607.5	1.8689840e+004		
3458.0	5.3292358e+002	3508.0	1.9575000e+003	3558.0	6.1594556e+003	3608.0	1.8963454e+004		
3458.5	5.3634697e+002	3508.5	1.9809914e+003	3558.5	6.1886870e+003	3608.5	1.9290186e+004		
3459.0	5.4222701e+002	3509.0	2.0165710e+003	3559.0	6.2219735e+003	3609.0	1.9793314e+004		
3459.5	5.4639936e+002	3509.5	2.0676628e+003	3559.5	6.2647832e+003	3609.5	2.0257593e+004		
3460.0	5.5019745e+002	3510.0	2.1261159e+003	3560.0	6.3233865e+003	3610.0	2.0670834e+004		
3460.5	5.5597012e+002	3510.5	2.1708574e+003	3560.5	6.3964779e+003	3610.5	2.0960843e+004		
3461.0	5.6534944e+002	3511.0	2.2021955e+003	3561.0	6.4467094e+003	3611.0	2.1191475e+004		
3461.5	5.7533297e+002	3511.5	2.2262173e+003	3561.5	6.5286695e+003	3611.5	2.1418618e+004		
3462.0	5.8683945e+002	3512.0	2.2458203e+003	3562.0	6.5909504e+003	3612.0	2.1688040e+004		
3462.5	5.9943507e+002	3512.5	2.2621642e+003	3562.5	6.6618398e+003	3612.5	2.2032317e+004		
3463.0	6.1465712e+002	3513.0	2.2758149e+003	3563.0	6.7402601e+003	3613.0	2.2408344e+004		
3463.5	6.2654496e+002	3513.5	2.2874375e+003	3563.5	6.8266359e+003	3613.5	2.2732556e+004		
3464.0	6.3429418e+002	3514.0	2.2973148e+003	3564.0	6.9217108e+003	3614.0	2.3008218e+004		
3464.5	6.3934495e+002	3514.5	2.3062064e+003	3564.5	7.0312174e+003	3614.5	2.3279791e+004		
3465.0	6.4348913e+002	3515.0	2.3137448e+003	3565.0	7.1600142e+003	3615.0	2.3548718e+004		
3465.5	6.4698253e+002	3515.5	2.3202080e+003	3565.5	7.3033081e+003	3615.5	2.3784755e+004		
3466.0	6.5180154e+002	3516.0	2.3267168e+003	3566.0	7.3602598e+003	3616.0	2.3991036e+004		
3466.5	6.6134127e+002	3516.5	2.3338470e+003	3566.5	7.4464817e+003	3616.5	2.4189919e+004		
3467.0	6.7860264e+002	3517.0	2.3426907e+003	3567.0	7.5645851e+003	3617.0	2.4412195e+004		
3467.5	6.9258028e+002	3517.5	2.3552545e+003	3567.5	7.6939903e+003	3617.5	2.4693667e+004		
3468.0	7.0885721e+002	3518.0	2.3701749e+003	3568.0	7.8742957e+003	3618.0	2.5061070e+004		
3468.5	7.0207696e+002	3518.5	2.3844171e+003	3568.5	8.2295030e+003	3618.5	2.5408823e+004		
3469.0	7.0407855e+002	3519.0	2.4005382e+003	3569.0	8.4734170e+003	3619.0	2.5795484e+004		
3469.5	7.0561614e+002	3519.5	2.4182787e+003	3569.5	8.6347745e+003	3619.5	2.6241916e+004		
3470.0	7.0729705e+002	3520.0	2.4357751e+003	3570.0	8.7480214e+003	3620.0	2.6719370e+004		
3470.5	7.1017655e+002	3520.5	2.4528936e+003	3570.5	8.8391586e+003	3620.5	2.7133856e+004		
3471.0	7.1296990e+002	3521.0	2.4715806e+003	3571.0	8.9175244e+003	3621.0	2.7465266e+004		
3471.5	7.1532254e+002	3521.5	2.4948891e+003	3571.5	9.0793866e+003	3621.5	2.7736511e+004		
3472.0	7.1742212e+002								

Table 5-8

Sam. No.	33	34	Sam. No.	33	34	Sam. No.	33	34	Sam. No.	33	34
$p(\text{atm})$	5.26 $\times 10^{-3}$	5.26 $\times 10^{-3}$	$p(\text{atm})$	5.26 $\times 10^{-3}$	5.26 $\times 10^{-3}$	$p(\text{atm})$	5.26 $\times 10^{-3}$	5.26 $\times 10^{-3}$	$p(\text{atm})$	5.26 $\times 10^{-3}$	5.26 $\times 10^{-3}$
$P_0(\text{atm})$	5.02 $\times 10^0$	1.002 $\times 10^0$	$P_0(\text{atm})$	5.02 $\times 10^0$	1.002 $\times 10^0$	$P_0(\text{atm})$	5.02 $\times 10^0$	1.002 $\times 10^0$	$P_0(\text{atm})$	5.02 $\times 10^0$	1.002 $\times 10^0$
$v(\text{gm/cm}^3)$	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	$v(\text{gm/cm}^3)$	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	$v(\text{gm/cm}^3)$	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	$v(\text{gm/cm}^3)$	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$
λ (μm)			λ (μm)			λ (μm)			λ (μm)		
T 100			T 100			T 100			T 100		
3540.0	2.82486	96.6	97.2	3540.0	2.80584	96.3	96.4	3580.0	2.78707	99.0	99.4
3540.2	2.82470	96.6	97.1	3540.2	2.80568	96.3	96.7	3580.2	2.78691	99.0	100.2
3540.4	2.82454	96.6	97.2	3540.4	2.80552	96.3	96.9	3580.4	2.78676	99.0	100.4
3540.6	2.82438	96.5	97.3	3540.6	2.80536	96.3	97.1	3580.6	2.78660	99.0	100.6
3540.8	2.82422	96.5	97.1	3540.8	2.80521	96.2	97.0	3580.8	2.78645	99.0	100.8
3541.0	2.82406	96.5	97.0	3541.0	2.80505	96.4	96.4	3581.0	2.78629	99.0	101.0
3541.2	2.82390	96.6	96.8	3541.2	2.80489	96.3	96.2	3581.2	2.78614	99.0	101.2
3541.4	2.82374	96.5	96.7	3541.4	2.80473	96.3	96.0	3581.4	2.78598	99.0	101.4
3541.6	2.82358	96.5	96.3	3541.6	2.80457	96.3	95.8	3581.6	2.78582	99.0	101.6
3541.8	2.82342	96.0	96.1	3541.8	2.80441	96.3	95.8	3581.8	2.78566	99.0	101.8
3542.0	2.82326	95.5	95.7	3542.0	2.80425	96.6	95.1	3582.0	2.78550	99.0	102.0
3542.2	2.82310	95.5	95.0	3542.2	2.80409	96.6	95.1	3582.2	2.78534	99.0	102.2
3542.4	2.82294	95.4	94.6	3542.4	2.80393	96.6	95.1	3582.4	2.78518	99.0	102.4
3542.6	2.82278	95.4	94.9	3542.6	2.80377	96.7	95.2	3582.6	2.78502	99.0	102.6
3542.8	2.82262	95.4	95.1	3542.8	2.80361	96.7	95.6	3582.8	2.78486	99.0	102.8
3543.0	2.82246	95.0	94.8	3543.0	2.80345	96.7	96.7	3583.0	2.78470	99.0	103.0
3543.2	2.82230	94.5	94.5	3543.2	2.80329	96.7	96.7	3583.2	2.78454	99.0	103.2
3543.4	2.82214	94.2	94.9	3543.4	2.80313	96.7	96.7	3583.4	2.78438	99.0	103.4
3543.6	2.82198	94.0	94.4	3543.6	2.80297	96.7	96.7	3583.6	2.78422	99.0	103.6
3543.8	2.82182	93.5	94.0	3543.8	2.80281	96.7	96.7	3583.8	2.78406	99.0	103.8
3544.0	2.82166	93.0	93.4	3544.0	2.80265	96.0	96.4	3584.0	2.78390	99.0	104.0
3544.2	2.82150	92.5	93.4	3544.2	2.80249	95.7	96.4	3584.2	2.78374	99.0	104.2
3544.4	2.82134	92.0	93.4	3544.4	2.80233	95.7	96.4	3584.4	2.78358	99.0	104.4
3544.6	2.82118	91.5	93.4	3544.6	2.80217	95.7	96.4	3584.6	2.78342	99.0	104.6
3544.8	2.82102	91.0	93.3	3544.8	2.80201	95.7	96.5	3584.8	2.78326	99.0	104.8
3545.0	2.82086	90.5	93.3	3545.0	2.80185	95.4	96.5	3585.0	2.78310	99.0	105.0
3545.2	2.82070	90.0	93.3	3545.2	2.80169	95.4	96.5	3585.2	2.78294	99.0	105.2
3545.4	2.82054	89.5	93.3	3545.4	2.80153	95.4	96.5	3585.4	2.78278	99.0	105.4
3545.6	2.82038	89.0	93.3	3545.6	2.80137	95.4	96.5	3585.6	2.78262	99.0	105.6
3545.8	2.82022	88.5	93.3	3545.8	2.80121	95.4	96.5	3585.8	2.78246	99.0	105.8
3546.0	2.82006	88.0	93.3	3546.0	2.80105	95.4	96.5	3586.0	2.78230	99.0	106.0
3546.2	2.81990	87.5	93.3	3546.2	2.80089	95.4	96.5	3586.2	2.78214	99.0	106.2
3546.4	2.81974	87.0	93.3	3546.4	2.80073	95.4	96.5	3586.4	2.78198	99.0	106.4
3546.6	2.81958	86.5	93.3	3546.6	2.80057	95.4	96.5	3586.6	2.78182	99.0	106.6
3546.8	2.81942	86.0	93.3	3546.8	2.80041	95.4	96.5	3586.8	2.78166	99.0	106.8
3547.0	2.81926	85.5	93.3	3547.0	2.80025	95.4	96.5	3587.0	2.78150	99.0	107.0
3547.2	2.81910	85.0	93.3	3547.2	2.80009	95.4	96.5	3587.2	2.78134	99.0	107.2
3547.4	2.81894	84.5	93.3	3547.4	2.80000	95.4	96.5	3587.4	2.78118	99.0	107.4
3547.6	2.81878	84.0	93.3	3547.6	2.79984	95.4	96.5	3587.6	2.78102	99.0	107.6
3547.8	2.81862	83.5	93.3	3547.8	2.79968	95.4	96.5	3587.8	2.78086	99.0	107.8
3548.0	2.81846	83.0	93.3	3548.0	2.79952	95.4	96.5	3588.0	2.78070	99.0	108.0
3548.2	2.81830	82.5	93.3	3548.2	2.79936	95.4	96.5	3588.2	2.78054	99.0	108.2
3548.4	2.81814	82.0	93.3	3548.4	2.79920	95.4	96.5	3588.4	2.78038	99.0	108.4
3548.6	2.81798	81.5	93.3	3548.6	2.79904	95.4	96.5	3588.6	2.78022	99.0	108.6
3548.8	2.81782	81.0	93.3	3548.8	2.79888	95.4	96.5	3588.8	2.78006	99.0	108.8
3549.0	2.81766	80.5	93.3	3549.0	2.79872	95.4	96.5	3589.0	2.77990	99.0	109.0
3549.2	2.81750	80.0	93.3	3549.2	2.79856	95.4	96.5	3589.2	2.77974	99.0	109.2
3549.4	2.81734	79.5	93.3	3549.4	2.79840	95.4	96.5	3589.4	2.77958	99.0	109.4
3549.6	2.81718	79.0	93.3	3549.6	2.79824	95.4	96.5	3589.6	2.77942	99.0	109.6
3549.8	2.81702	78.5	93.3	3549.8	2.79808	95.4	96.5	3589.8	2.77926	99.0	109.8
3550.0	2.81686	78.0	93.3	3550.0	2.79792	95.4	96.5	3590.0	2.77910	99.0	110.0
3550.2	2.81670	77.5	93.3	3550.2	2.79776	95.4	96.5	3590.2	2.77894	99.0	110.2
3550.4	2.81654	77.0	93.3	3550.4	2.79760	95.4	96.5	3590.4	2.77878	99.0	110.4
3550.6	2.81638	76.5	93.3	3550.6	2.79744	95.4	96.5	3590.6	2.77862	99.0	110.6
3550.8	2.81622	76.0	93.3	3550.8	2.79728	95.4	96.5	3590.8	2.77846	99.0	110.8
3551.0	2.81606	75.5	93.3	3551.0	2.79712	95.4	96.5	3591.0	2.77830	99.0	111.0
3551.2	2.81590	75.0	93.3	3551.2	2.79696	95.4	96.5	3591.2	2.77814	99.0	111.2
3551.4	2.81574	74.5	93.3	3551.4	2.79680	95.4	96.5	3591.4	2.77798	99.0	111.4
3551.6	2.81558	74.0	93.3	3551.6	2.79664	95.4	96.5	3591.6	2.77782	99.0	111.6
3551.8	2.81542	73.5	93.3	3551.8	2.79648	95.4	96.5	3591.8	2.77766	99.0	111.8
3552.0	2.81526	73.0	93.3	3552.0	2.79632	95.4	96.5	3592.0	2.77750	99.0	112.0
3552.2	2.81510	72.5	93.3	3552.2	2.79616	95.4	96.5	3592.2	2.77734	99.0	112.2
3552.4	2.81494	72.0	93.3	3552.4	2.79600	95.4	96.5	3592.4	2.77718	99.0	112.4
3552.6	2.81478	71.5	93.3	3552.6	2.79584	95.4	96.5	3592.6	2.77702	99.0	112.6
3552.8	2.81462	71.0	93.3	3552.8	2.79568	95.4	96.5	3592.8	2.77686	99.0	112.8
3553.0	2.81446	70.5	93.3	3553.0	2.79552	95.4	96.5	3593.0	2.77670	99.0	113.0
3553.2	2.81430	70.0	93.3	3553.2	2.79536	95.4	96.5	3593.2	2.77654	99.0	113.2
3553.4	2.81414	69.5	93.3	3553.4	2.79520	95.4	96.5	3593.4	2.77638	99.0	113.4
3553.6	2.81398	6									

Table 5-8 (Cont'd)

Sam. No.	33	34	Sam. No.	35	36	Sam. No.	37	38	Sam. No.	39	40	Sam. No.	41	42	Sam. No.	43	44	Sam. No.	45	46	Sam. No.	47	48	Sam. No.	49	50	Sam. No.	51	52	Sam. No.	53	54	Sam. No.	55	56	Sam. No.	57	58	Sam. No.	59	60	Sam. No.	61	62	Sam. No.	63	64	Sam. No.	65	66	Sam. No.	67	68	Sam. No.	69	70	Sam. No.	71	72	Sam. No.	73	74	Sam. No.	75	76	Sam. No.	77	78	Sam. No.	79	80	Sam. No.	81	82	Sam. No.	83	84	Sam. No.	85	86	Sam. No.	87	88	Sam. No.	89	90	Sam. No.	91	92	Sam. No.	93	94	Sam. No.	95	96	Sam. No.	97	98	Sam. No.	99	100	Sam. No.	101	102	Sam. No.	103	104	Sam. No.	105	106	Sam. No.	107	108	Sam. No.	109	110	Sam. No.	111	112	Sam. No.	113	114	Sam. No.	115	116	Sam. No.	117	118	Sam. No.	119	120	Sam. No.	121	122	Sam. No.	123	124	Sam. No.	125	126	Sam. No.	127	128	Sam. No.	129	130	Sam. No.	131	132	Sam. No.	133	134	Sam. No.	135	136	Sam. No.	137	138	Sam. No.	139	140	Sam. No.	141	142	Sam. No.	143	144	Sam. No.	145	146	Sam. No.	147	148	Sam. No.	149	150	Sam. No.	151	152	Sam. No.	153	154	Sam. No.	155	156	Sam. No.	157	158	Sam. No.	159	160	Sam. No.	161	162	Sam. No.	163	164	Sam. No.	165	166	Sam. No.	167	168	Sam. No.	169	170	Sam. No.	171	172	Sam. No.	173	174	Sam. No.	175	176	Sam. No.	177	178	Sam. No.	179	180	Sam. No.	181	182	Sam. No.	183	184	Sam. No.	185	186	Sam. No.	187	188	Sam. No.	189	190	Sam. No.	191	192	Sam. No.	193	194	Sam. No.	195	196	Sam. No.	197	198	Sam. No.	199	200	Sam. No.	201	202	Sam. No.	203	204	Sam. No.	205	206	Sam. No.	207	208	Sam. No.	209	210	Sam. No.	211	212	Sam. No.	213	214	Sam. No.	215	216	Sam. No.	217	218	Sam. No.	219	220	Sam. No.	221	222	Sam. No.	223	224	Sam. No.	225	226	Sam. No.	227	228	Sam. No.	229	230	Sam. No.	231	232	Sam. No.	233	234	Sam. No.	235	236	Sam. No.	237	238	Sam. No.	239	240	Sam. No.	241	242	Sam. No.	243	244	Sam. No.	245	246	Sam. No.	247	248	Sam. No.	249	250	Sam. No.	251	252	Sam. No.	253	254	Sam. No.	255	256	Sam. No.	257	258	Sam. No.	259	260	Sam. No.	261	262	Sam. No.	263	264	Sam. No.	265	266	Sam. No.	267	268	Sam. No.	269	270	Sam. No.	271	272	Sam. No.	273	274	Sam. No.	275	276	Sam. No.	277	278	Sam. No.	279	280	Sam. No.	281	282	Sam. No.	283	284	Sam. No.	285	286	Sam. No.	287	288	Sam. No.	289	290	Sam. No.	291	292	Sam. No.	293	294	Sam. No.	295	296	Sam. No.	297	298	Sam. No.	299	300	Sam. No.	301	302	Sam. No.	303	304	Sam. No.	305	306	Sam. No.	307	308	Sam. No.	309	310	Sam. No.	311	312	Sam. No.	313	314	Sam. No.	315	316	Sam. No.	317	318	Sam. No.	319	320	Sam. No.	321	322	Sam. No.	323	324	Sam. No.	325	326	Sam. No.	327	328	Sam. No.	329	330	Sam. No.	331	332	Sam. No.	333	334	Sam. No.	335	336	Sam. No.	337	338	Sam. No.	339	340	Sam. No.	341	342	Sam. No.	343	344	Sam. No.	345	346	Sam. No.	347	348	Sam. No.	349	350	Sam. No.	351	352	Sam. No.	353	354	Sam. No.	355	356	Sam. No.	357	358	Sam. No.	359	360	Sam. No.	361	362	Sam. No.	363	364	Sam. No.	365	366	Sam. No.	367	368	Sam. No.	369	370	Sam. No.	371	372	Sam. No.	373	374	Sam. No.	375	376	Sam. No.	377	378	Sam. No.	379	380	Sam. No.	381	382	Sam. No.	383	384	Sam. No.	385	386	Sam. No.	387	388	Sam. No.	389	390	Sam. No.	391	392	Sam. No.	393	394	Sam. No.	395	396	Sam. No.	397	398	Sam. No.	399	400	Sam. No.	401	402	Sam. No.	403	404	Sam. No.	405	406	Sam. No.	407	408	Sam. No.	409	410	Sam. No.	411	412	Sam. No.	413	414	Sam. No.	415	416	Sam. No.	417	418	Sam. No.	419	420	Sam. No.	421	422	Sam. No.	423	424	Sam. No.	425	426	Sam. No.	427	428	Sam. No.	429	430	Sam. No.	431	432	Sam. No.	433	434	Sam. No.	435	436	Sam. No.	437	438	Sam. No.	439	440	Sam. No.	441	442	Sam. No.	443	444	Sam. No.	445	446	Sam. No.	447	448	Sam. No.	449	450	Sam. No.	451	452	Sam. No.	453	454	Sam. No.	455	456	Sam. No.	457	458	Sam. No.	459	460	Sam. No.	461	462	Sam. No.	463	464	Sam. No.	465	466	Sam. No.	467	468	Sam. No.	469	470	Sam. No.	471	472	Sam. No.	473	474	Sam. No.	475	476	Sam. No.	477	478	Sam. No.	479	480	Sam. No.	481	482	Sam. No.	483	484	Sam. No.	485	486	Sam. No.	487	488	Sam. No.	489	490	Sam. No.	491	492	Sam. No.	493	494	Sam. No.	495	496	Sam. No.	497	498	Sam. No.	499	500	Sam. No.	501	502	Sam. No.	503	504	Sam. No.	505	506	Sam. No.	507	508	Sam. No.	509	510	Sam. No.	511	512	Sam. No.	513	514	Sam. No.	515	516	Sam. No.	517	518	Sam. No.	519	520	Sam. No.	521	522	Sam. No.	523	524	Sam. No.	525	526	Sam. No.	527	528	Sam. No.	529	530	Sam. No.	531	532	Sam. No.	533	534	Sam. No.	535	536	Sam. No.	537	538	Sam. No.	539	540	Sam. No.	541	542	Sam. No.	543	544	Sam. No.	545	546	Sam. No.	547	548	Sam. No.	549	550	Sam. No.	551	552	Sam. No.	553	554	Sam. No.	555	556	Sam. No.	557	558	Sam. No.	559	560	Sam. No.	561	562	Sam. No.	563	564	Sam. No.	565	566	Sam. No.	567	568	Sam. No.	569	570	Sam. No.	571	572	Sam. No.	573	574	Sam. No.	575	576	Sam. No.	577	578	Sam. No.	579	580	Sam. No.	581	582	Sam. No.	583	584	Sam. No.	585	586	Sam. No.	587	588	Sam. No.	589	590	Sam. No.	591	592	Sam. No.	593	594	Sam. No.	595	596	Sam. No.	597	598	Sam. No.	599	600	Sam. No.	601	602	Sam. No.	603	604	Sam. No.	605	606	Sam. No.	607	608	Sam. No.	609	610	Sam. No.	611	612	Sam. No.	613	614	Sam. No.	615	616	Sam. No.	617	618	Sam. No.	619	620	Sam. No.	621	622	Sam. No.	623	624	Sam. No.	625	626	Sam. No.	627	628	Sam. No.	629	630	Sam. No.	631	632	Sam. No.	633	634	Sam. No.	635	636	Sam. No.	637	638	Sam. No.	639	640	Sam. No.	641	642	Sam. No.	643	644	Sam. No.	645	646	Sam. No.	647	648	Sam. No.	649	650	Sam. No.	651	652	Sam. No.	653	654	Sam. No.	655	656	Sam. No.	657	658	Sam. No.	659	660	Sam. No.	661	662	Sam. No.	663	664	Sam. No.	665	666	Sam. No.	667	668	Sam. No.	669	670	Sam. No.	671	672	Sam. No.	673	674	Sam. No.	675	676	Sam. No.	677	678	Sam. No.	679	680	Sam. No.	681	682	Sam. No.	683	684	Sam. No.	685	686	Sam. No.	687	688	Sam. No.	689	690	Sam. No.	691	692	Sam. No.	693	694	Sam. No.	695	696	Sam. No.	697	698	Sam. No.	699	700	Sam. No.	701	702	Sam. No.	703	704	Sam. No.	705	706	Sam. No.	707	708	Sam. No.	709	710	Sam. No.	711	712	Sam. No.	713	714	Sam. No.	715	716	Sam. No.	717	718	Sam. No.	719	720	Sam. No.	721	722	Sam. No.	723	724	Sam. No.	725	726	Sam. No.	727	728	Sam. No.	729	730	Sam. No.	731	732	Sam. No.	733	734	Sam. No.	735	736	Sam. No.	737	738	Sam. No.	739	740	Sam. No.	741	742	Sam. No.	743	744	Sam. No.	745	746	Sam. No.	747	748	Sam. No.	749	750	Sam. No.	751	752	Sam. No.	753	754	Sam. No.	755	756	Sam. No.	757	758	Sam. No.	759	760	Sam. No.	761	762	Sam. No.	763	764	Sam. No.	765	766	Sam. No.	767	768	Sam. No.	769	770	Sam. No.	771	772	Sam. No.	773	774	Sam. No.	775	776	Sam. No.	777	778	Sam. No.	779	780	Sam. No.	781	782	Sam. No.	783	784	Sam. No.	785	786	Sam. No.	787	788	Sam. No.	789	790	Sam. No.	791	792	Sam. No.	793	794	Sam. No.	795	796	Sam. No.	797	798	Sam. No.	799	800	Sam. No.	801	802	Sam. No.	803	804	Sam. No.	805	806	Sam. No.	807	808	Sam. No.	809	810	Sam. No.	811	812	Sam. No.	813	814	Sam. No.	815	816	Sam. No.	817	818	Sam. No.	819	820	Sam. No.	821	822	Sam. No.	823	824	Sam. No.	825	826	Sam. No.	827	828	Sam. No.	829	830	Sam. No.	831	832	Sam. No.	833	834	Sam. No.	835	836	Sam. No.	837	838	Sam. No.	839	840	Sam. No.	841	842	Sam. No.	843	844	Sam. No.	845	846	Sam. No.	847	848	Sam. No.	849	850	Sam. No.	851	852	Sam. No.	853	854	Sam. No.	855	856	Sam. No.	857	858	Sam. No.	859	860	Sam. No.	861	862	Sam. No.	863	864	Sam. No.	865	866	Sam. No.	867	868	Sam. No.	869	870	Sam. No.	871	872	Sam. No.	873	874	Sam. No.	875	876	Sam. No.	877	878	Sam. No.	879	880	Sam. No.	881	882	Sam. No.	883	884	Sam. No.	885	886	Sam. No.	887	888	Sam. No.	889	890	Sam. No.	891	892	Sam. No.	893	894	Sam. No.	895	896	Sam. No.	897	898	Sam. No.	899	900	Sam. No.	901	902	Sam. No.	903	904	Sam. No.	905	906	Sam. No.	907	908	Sam. No.	909	910	Sam. No.	911	912	Sam. No.	913	914	Sam. No.	915	916	Sam. No.	917	918	Sam. No.	919	920	Sam. No.	921	922	Sam. No.	923	924	Sam. No.	925	926	Sam. No.	927	928	Sam. No.	929	930	Sam. No.	931	932	Sam. No.	933	934	Sam. No.	935	936	Sam. No.	937	938	Sam. No.	939	940	Sam. No.	941	942	Sam. No.	943	944	Sam. No.	945	946	Sam. No.	947	948	Sam. No.	949	950	Sam. No.	951	952	Sam. No.	953	954	Sam. No.	955	956	Sam. No.	957	958	Sam. No.	959	960	Sam. No.	961	962	Sam. No.	963	964	Sam. No.	965	966	Sam. No.	967	968	Sam. No.	969	970	Sam. No.	971	972	Sam. No.	973	974	Sam. No.	975	976	Sam. No.	977	978	Sam. No.	979	980	Sam. No.	981	982	Sam. No.	983	984	Sam. No.	985	986	Sam. No.	987	988	Sam. No.	989	990	Sam. No.	991	992	Sam. No.	993	994	Sam. No.	995	996	Sam. No.	997	998	Sam. No.	999	1000
p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5.26	p (atm)	5.26	5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												

Table 5-8 (Cont'd)

Sam. No.	11	34	Sam. No.	11	34	Sam. No.	11	34	Sam. No.	11	34	Sam. No.	11	34	
$p(\text{atm})$	5.26×10^{-1}	5.26×10^{-1}	$p(\text{atm})$	5.26×10^{-1}	5.26×10^{-1}	$p(\text{atm})$	5.26×10^{-1}	5.26×10^{-1}	$p(\text{atm})$	5.26×10^{-1}	5.26×10^{-1}	$p(\text{atm})$	5.26×10^{-1}	5.26×10^{-1}	
$P_0(\text{atm})$	5.02×10^0	1.002×10^1	$P_0(\text{atm})$	5.02×10^0	1.002×10^1	$P_0(\text{atm})$	5.02×10^0	1.002×10^1	$P_0(\text{atm})$	5.02×10^0	1.002×10^1	$P_0(\text{atm})$	5.02×10^0	1.002×10^1	
$v(\text{gm/cm}^3)$	8.0×10^{-4}	8.0×10^{-4}	$v(\text{gm/cm}^3)$	8.0×10^{-4}	8.0×10^{-4}	$v(\text{gm/cm}^3)$	8.0×10^{-4}	8.0×10^{-4}	$v(\text{gm/cm}^3)$	8.0×10^{-4}	8.0×10^{-4}	$v(\text{gm/cm}^3)$	8.0×10^{-4}	8.0×10^{-4}	
λ (cm^{-1})	λ (microns)	T $\times 100$	T $\times 100$	λ (cm^{-1})	λ (microns)	T $\times 100$	T $\times 100$	λ (cm^{-1})	λ (microns)	T $\times 100$	T $\times 100$	λ (cm^{-1})	λ (microns)	T $\times 100$	T $\times 100$
1780.0	2.64550	61.1	67.4	1804.0	2.62881	65.5	70.9	1828.0	2.61213	75.3	67.5	1852.0	2.59545	7.2	11.0
1780.2	2.64558	69.8	70.0	1804.2	2.62887	67.8	72.7	1828.2	2.61219	76.7	68.1	1852.2	2.59552	7.5	15.1
1780.4	2.64562	78.8	72.5	1804.4	2.62894	69.0	73.9	1828.4	2.61226	78.3	69.8	1852.4	2.59559	17.0	7.9
1780.6	2.64568	80.3	75.1	1804.6	2.62900	69.8	76.5	1828.6	2.61192	79.4	70.5	1852.6	2.59565	12.9	17.1
1780.8	2.64574	80.4	77.3	1804.8	2.62876	69.2	76.3	1828.8	2.61178	80.4	71.0	1852.8	2.59551	14.0	7.9
1781.0	2.64580	85.5	78.9	1805.0	2.62812	68.4	75.6	1829.0	2.61165	81.7	71.4	1853.0	2.59538	12.5	9.0
1781.2	2.64586	87.0	80.3	1805.2	2.62798	68.4	77.3	1829.2	2.61151	82.0	71.3	1853.2	2.59525	9.6	7.9
1781.4	2.64592	88.0	81.6	1805.4	2.62784	63.7	75.3	1829.4	2.61138	81.9	70.9	1853.4	2.59511	6.7	6.6
1781.6	2.64598	88.6	82.5	1805.6	2.62771	60.6	69.1	1829.6	2.61124	81.7	70.4	1853.6	2.59498	4.6	5.7
1781.8	2.64604	89.9	83.0	1805.8	2.62757	59.9	67.3	1829.8	2.61110	80.9	69.4	1853.8	2.59484	3.7	5.1
1782.0	2.64610	89.5	83.8	1806.0	2.62743	49.4	63.0	1830.0	2.61097	79.4	68.0	1854.0	2.59471	3.6	5.2
1782.2	2.64616	90.1	84.4	1806.2	2.62729	41.9	58.9	1830.2	2.61083	77.4	66.3	1854.2	2.59457	4.4	5.9
1782.4	2.64622	90.6	84.6	1806.4	2.62715	33.7	54.9	1830.4	2.61069	75.7	64.7	1854.4	2.59444	6.9	7.5
1782.6	2.64628	90.8	84.9	1806.6	2.62702	25.8	51.7	1830.6	2.61056	71.3	61.7	1854.6	2.59430	11.9	10.5
1782.8	2.64634	90.9	84.9	1806.8	2.62688	19.2	49.4	1830.8	2.61042	66.1	58.5	1854.8	2.59417	18.8	14.3
1783.0	2.64640	90.8	86.7	1807.0	2.62674	15.0	48.3	1831.0	2.61028	59.0	55.3	1855.0	2.59403	27.2	14.7
1783.2	2.64646	90.2	86.7	1807.2	2.62660	15.8	48.3	1831.2	2.61015	56.0	54.3	1855.2	2.59390	36.1	23.7
1783.4	2.64653	89.8	86.1	1807.4	2.62646	10.1	40.6	1831.4	2.61001	42.7	49.7	1855.4	2.59376	63.5	24.7
1783.6	2.64659	88.2	83.4	1807.6	2.62633	27.9	36.0	1831.6	2.60988	37.4	48.1	1855.6	2.59363	69.3	31.4
1783.8	2.64665	86.5	82.6	1807.8	2.62619	37.8	38.4	1831.8	2.60974	37.3	48.0	1855.8	2.59350	53.7	37.3
1784.0	2.64671	83.7	81.5	1808.0	2.62605	67.7	43.3	1832.0	2.60960	42.1	49.2	1856.0	2.59336	56.7	43.6
1784.2	2.64677	80.7	80.8	1808.2	2.62591	55.4	40.7	1832.2	2.60947	49.1	51.2	1856.2	2.59323	57.8	43.5
1784.4	2.64683	78.1	80.0	1808.4	2.62577	62.8	52.6	1832.4	2.60933	56.5	53.6	1856.4	2.59310	56.6	45.1
1784.6	2.64689	76.9	79.6	1808.6	2.62564	68.2	56.9	1832.6	2.60919	62.4	55.9	1856.6	2.59296	53.8	46.2
1784.8	2.64695	77.6	79.5	1808.8	2.62550	72.5	60.5	1832.8	2.60906	67.3	57.6	1856.8	2.59282	50.7	47.2
1785.0	2.64701	74.3	83.1	1809.0	2.62536	75.7	63.4	1833.0	2.60892	70.1	58.8	1857.0	2.59269	50.9	47.8
1785.2	2.64707	81.5	80.6	1809.2	2.62522	78.1	66.1	1833.2	2.60879	71.3	59.0	1857.2	2.59255	57.2	51.1
1785.4	2.64713	83.7	81.6	1809.4	2.62508	90.1	68.9	1833.4	2.60865	77.7	71.7	1857.4	2.59242	61.0	54.6
1785.6	2.64719	85.5	82.4	1809.6	2.62495	91.8	70.2	1833.6	2.60851	70.6	57.4	1857.6	2.59229	67.0	57.0
1785.8	2.64725	87.1	83.3	1809.8	2.62481	82.9	71.6	1833.8	2.60838	68.4	55.8	1857.8	2.59215	71.6	57.8
1786.0	2.64731	88.1	84.1	1810.0	2.62467	83.7	72.9	1834.0	2.60824	66.5	53.5	1858.0	2.59202	74.8	62.5
1786.2	2.64737	89.1	84.7	1810.2	2.62453	84.5	74.0	1834.2	2.60811	58.7	49.4	1858.2	2.59189	77.1	69.7
1786.4	2.64743	90.0	85.4	1810.4	2.62440	85.1	74.8	1834.4	2.60797	50.6	46.1	1858.4	2.59175	76.7	66.5
1786.6	2.64749	90.7	85.9	1810.6	2.62426	85.8	75.2	1834.6	2.60783	41.8	43.3	1858.6	2.59161	79.9	67.8
1786.8	2.64755	91.1	86.5	1810.8	2.62412	85.9	75.7	1834.8	2.60770	30.4	40.6	1858.8	2.59148	80.6	59.8
1787.0	2.64761	91.6	87.0	1811.0	2.62398	86.2	76.0	1835.0	2.60756	30.4	40.7	1859.0	2.59134	81.0	69.5
1787.2	2.64767	92.2	87.4	1811.2	2.62385	86.4	76.2	1835.2	2.60743	32.6	40.4	1859.2	2.59121	81.5	70.0
1787.4	2.64773	92.7	87.8	1811.4	2.62371	86.4	76.2	1835.4	2.60729	38.6	39.1	1859.4	2.59108	81.6	70.3
1787.6	2.64779	93.1	88.1	1811.6	2.62357	86.4	76.1	1835.6	2.60715	45.1	40.2	1859.6	2.59094	81.6	70.3
1787.8	2.64785	93.6	88.3	1811.8	2.62343	86.2	75.9	1835.8	2.60702	50.4	40.8	1859.8	2.59081	81.5	73.0
1788.0	2.64791	93.7	88.5	1812.0	2.62329	85.9	75.4	1836.0	2.60688	60.4	40.6	1860.0	2.59067	80.8	69.4
1788.2	2.64797	93.7	88.6	1812.2	2.62315	85.4	75.1	1836.2	2.60675	52.3	39.4	1860.2	2.59054	79.6	68.4
1788.4	2.64803	93.7	88.6	1812.4	2.62302	85.1	74.6	1836.4	2.60661	49.6	37.1	1860.4	2.59041	77.8	66.8
1788.6	2.64809	93.5	88.6	1812.6	2.62288	84.5	74.2	1836.6	2.60647	46.4	35.7	1860.6	2.59027	75.3	65.7
1788.8	2.64815	93.5	88.7	1812.8	2.62274	83.8	72.6	1836.8	2.60634	37.5	29.8	1860.8	2.59014	71.3	62.2
1789.0	2.64821	93.2	88.6	1813.0	2.62261	83.0	71.3	1837.0	2.60620	29.1	25.7	1861.0	2.59000	65.3	59.0
1789.2	2.64827	93.0	88.5	1813.2	2.62247	82.0	70.3	1837.2	2.60607	20.6	21.5	1861.2	2.58987	58.3	54.2
1789.4	2.64833	92.5	88.5	1813.4	2.62233	80.5	68.1	1837.4	2.60593	13.1	18.3	1861.4	2.58973	49.6	52.3
1789.6	2.64839	93.3	88.6	1813.6	2.62219	79.6	66.1	1837.6	2.60580	8.4	15.2	1861.6	2.58960	42.5	50.2
1789.8	2.64845	93.4	88.7	1813.8	2.62206	78.6	63.1	1837.8	2.60566	6.7	14.1	1861.8	2.58947	61.7	49.3
1790.0	2.64851	93.7	88.7	1814.0	2.62192	76.2	61.0	1838.0	2.60552	7.9	14.6	1862.0	2.58933	53.6	52.2
1790.2	2.64857	93.9	88.7	1814.2	2.62178	71.1	57.8	1838.2	2.60539	11.6	16.0	1862.2	2.58920	43.8	51.4
1790.4	2.64863	94.0	88.8	1814.4	2.62164	66.9	53.6	1838.4	2.60525	19.0	14.7	1862.4	2.58906	63.2	54.2
1790.6	2.64869	94.0	88.8	1814.6	2.62151	61.9	49.3	1838.6	2.60512	25.2	21.9	1862.6	2.58893	66.6	56.1
1790.8	2.64875	93.6	88.5	1814.8	2.62137	55.5	46.1	1838.8	2.60498	31.5	23.4	1862.8	2.58880	67.5	57.4
1791.0	2.64881	93.8	88.5	1815.0	2.62123	67.7	39.2	1839.0	2.60485	38.4	24.9	1863.0	2.58866	69.5	58.2
1791.2	2.64887	93.7	88.3	1815.2	2.62109	38.7	33.6	1839.2	2.60471	42.2	31.6	1863.2	2.58853	69.1	58.0
1791.4	2.64893	94.0	88.1	1815.4	2.62096	28.1	28.0	1839.4	2.60457	43.7	33.8	1863.4	2.58840	76.9	54.9
1791.6	2.64899	93.3	87.9	1815.6	2.62082	19.2	23.3	1839.6	2.60443	43.3	35.1	1863.6	2.58827	82.7	51.2
1791.8	2.64905	93.1	87.7	1815.8	2.62068	12.3	19.8	1839.8	2.60430	42.3	36.5	1863.8	2.58813	60.5	52.8
1792.0	2.64911	93.1	87.4	1816.0	2.62055	8.1	17.7	1840.0	2.60417	42.0	37.3	1864.0	2.58800	55.5	49.6
1792.2	2.64917	92.7	87.0	1816.2	2.62041	8.2	17.2	1840.2	2.60403	42.0	37.4	1864.2	2.58786	49.6	46.1
1792.4	2.64923	92.6	86.6	1816.4	2.62027	10.5	18.1	1840.4	2.60389	40.3	36.1	1864.4	2.58773	40.8	43.8
1792.6	2.64929	92.3	86.4	1816.6	2.62013	15.5	21.1	1840.6	2.60376	39.1	36.5	1864.6	2.58759	33.9	39.0
1792.8	2.64935	91.9	86.0	1816.8	2.62000	24.6	24.1	1840.8	2.60362	37.8	36.8	1864.8	2.58746	26.8	36.1
1793.0	2.64941	91.7	85.5												

Table 5-8 (Cont'd)

Sm. No.	31	34	Sm. No.	31	34	Sm. No.	31	34			
$p(\text{atm})$	5.26×10^{-3}	5.26×10^{-3}	$p(\text{atm})$	5.26×10^{-3}	5.26×10^{-3}	$p(\text{atm})$	5.26×10^{-3}	5.26×10^{-3}			
$P_r(\text{atm})$	5.02×10^2	1.002×10^3	$P_r(\text{atm})$	5.02×10^2	1.002×10^3	$P_r(\text{atm})$	5.02×10^2	1.002×10^3			
$w(\text{gm/cm}^3)$	8.0×10^{-4}	8.0×10^{-4}	$w(\text{gm/cm}^3)$	8.0×10^{-4}	8.0×10^{-4}	$w(\text{gm/cm}^3)$	8.0×10^{-4}	8.0×10^{-4}			
(cm ³)	(microns)	T = 100	T = 100	(cm ³)	(microns)	T = 100	T = 100	(cm ³)	(microns)	T = 100	T = 100
1900.0	2.56410	55.1	48.4	1924.0	2.56884	82.4	82.2	1948.0	2.57293	85.4	85.8
1900.2	2.56397	67.1	51.7	1924.2	2.56879	91.2	81.1	1948.2	2.57280	87.4	87.1
1900.4	2.56384	68.0	53.2	1924.4	2.56864	79.5	80.2	1948.4	2.57267	90.8	88.9
1900.6	2.56371	67.0	53.6	1924.6	2.56850	77.6	78.1	1948.6	2.57254	92.4	89.6
1900.8	2.56358	65.3	52.1	1924.8	2.56836	76.7	78.4	1948.8	2.57241	92.4	90.7
1901.0	2.56345	60.2	48.5	1925.0	2.56777	71.8	78.4	1949.0	2.57229	91.7	90.6
1901.2	2.56331	51.7	43.5	1925.2	2.56764	71.5	78.8	1949.2	2.57216	89.4	90.0
1901.4	2.56318	40.1	37.4	1925.4	2.56750	70.9	80.1	1949.4	2.57203	87.9	89.4
1901.6	2.56305	29.2	32.4	1925.6	2.56738	80.3	82.3	1949.6	2.57190	85.2	89.0
1901.8	2.56292	27.9	29.3	1925.8	2.56725	85.4	84.5	1949.8	2.57177	84.0	88.7
1902.0	2.56279	23.4	29.7	1926.0	2.56712	89.5	86.8	1950.0	2.57165	84.4	89.0
1902.2	2.56266	12.2	15.4	1926.2	2.56699	92.3	87.7	1950.2	2.57152	84.4	89.4
1902.4	2.56253	42.8	38.5	1926.4	2.56686	94.0	90.5	1950.4	2.57139	89.2	90.5
1902.6	2.56239	52.1	43.4	1926.6	2.56673	95.2	91.8	1950.6	2.57126	91.5	91.7
1902.8	2.56226	57.7	47.0	1926.8	2.56660	95.9	92.5	1950.8	2.57113	93.5	92.7
1903.0	2.56213	58.3	48.1	1927.0	2.56647	96.2	93.2	1951.0	2.57100	95.2	93.4
1903.2	2.56200	56.7	48.1	1927.2	2.56634	96.4	93.4	1951.2	2.57088	96.3	94.4
1903.4	2.56187	50.8	46.7	1927.4	2.56621	96.4	93.5	1951.4	2.57075	97.0	94.8
1903.6	2.56174	47.7	46.3	1927.6	2.56608	96.1	93.4	1951.6	2.57062	97.4	95.1
1903.8	2.56161	34.0	42.1	1927.8	2.56595	95.7	93.4	1951.8	2.57049	97.4	95.5
1904.0	2.56148	28.2	41.0	1928.0	2.56582	95.0	93.1	1952.0	2.57036	97.5	95.6
1904.2	2.56135	23.4	41.9	1928.2	2.56570	94.0	92.8	1952.2	2.57024	97.9	95.7
1904.4	2.56122	15.0	40.9	1928.4	2.56557	94.0	92.8	1952.4	2.57011	98.0	95.7
1904.6	2.56108	44.8	40.1	1928.6	2.56544	93.5	92.1	1952.6	2.57000	96.4	95.4
1904.8	2.56095	54.7	53.9	1928.8	2.56531	92.9	91.6	1952.8	2.56985	95.8	95.4
1905.0	2.56082	61.6	58.3	1929.0	2.56518	90.4	91.1	1953.0	2.56972	95.5	95.5
1905.2	2.56069	65.4	60.7	1929.2	2.56505	90.0	90.7	1953.2	2.56959	95.7	95.4
1905.4	2.56056	46.4	64.1	1929.4	2.56492	88.1	90.0	1953.4	2.56946	96.3	95.8
1905.6	2.56043	44.1	65.9	1929.6	2.56479	88.1	89.5	1953.6	2.56933	97.1	96.8
1905.8	2.56030	44.1	65.9	1929.8	2.56466	88.4	89.2	1953.8	2.56920	97.4	96.3
1906.0	2.56016	47.0	69.4	1930.0	2.56453	88.8	89.8	1954.0	2.56906	98.3	96.5
1906.2	2.56003	71.8	72.0	1930.2	2.56440	88.4	89.5	1954.2	2.56893	98.3	96.8
1906.4	2.55990	77.5	76.9	1930.4	2.56427	87.4	89.1	1954.4	2.56880	98.7	97.0
1906.6	2.55977	82.5	77.9	1930.6	2.56414	87.2	87.4	1954.6	2.56867	98.7	97.6
1906.8	2.55964	86.4	80.7	1930.8	2.56401	87.8	87.2	1954.8	2.56854	98.6	97.1
1907.0	2.55951	89.2	83.2	1931.0	2.56388	88.5	86.7	1955.0	2.56841	98.5	97.1
1907.2	2.55938	91.1	85.2	1931.2	2.56375	88.4	85.8	1955.2	2.56828	98.4	97.0
1907.4	2.55925	92.5	86.8	1931.4	2.56362	87.4	85.1	1955.4	2.56815	98.9	97.2
1907.6	2.55912	93.3	88.0	1931.6	2.56349	87.5	84.1	1955.6	2.56802	98.5	97.1
1907.8	2.55899	94.0	89.1	1931.8	2.56336	76.6	76.7	1955.8	2.56789	98.6	97.0
1908.0	2.55886	94.6	90.0	1932.0	2.56323	87.7	71.7	1956.0	2.56776	98.4	96.8
1908.2	2.55873	95.2	90.7	1932.2	2.56310	86.4	80.7	1956.2	2.56763	98.1	96.9
1908.4	2.55860	95.6	91.4	1932.4	2.56297	86.1	82.7	1956.4	2.56750	97.4	96.5
1908.6	2.55847	96.0	92.0	1932.6	2.56284	81.1	84.3	1956.6	2.56737	96.7	96.2
1908.8	2.55834	96.4	92.5	1932.8	2.56271	72.2	70.4	1956.8	2.56724	96.1	96.0
1909.0	2.55821	96.4	92.9	1933.0	2.56258	83.5	78.1	1957.0	2.56711	96.1	96.8
1909.2	2.55808	96.5	93.2	1933.2	2.56245	80.2	83.7	1957.2	2.56698	96.0	96.8
1909.4	2.55795	96.7	93.5	1933.4	2.56232	81.4	87.1	1957.4	2.56685	97.4	96.2
1909.6	2.55782	96.9	93.6	1933.6	2.56219	91.5	88.4	1957.6	2.56672	97.7	96.9
1909.8	2.55769	97.1	93.9	1933.8	2.56207	90.4	89.4	1957.8	2.56659	97.7	96.4
1910.0	2.55756	97.2	94.4	1934.0	2.56194	90.0	89.9	1958.0	2.56646	97.6	96.5
1910.2	2.55743	97.2	94.6	1934.2	2.56181	81.0	90.8	1958.2	2.56633	97.7	96.7
1910.4	2.55730	97.3	94.6	1934.4	2.56168	83.6	90.0	1958.4	2.56620	98.0	96.8
1910.6	2.55717	97.4	94.7	1934.6	2.56155	90.7	91.0	1958.6	2.56607	98.4	97.1
1910.8	2.55704	97.5	94.7	1934.8	2.56143	90.1	91.0	1958.8	2.56594	98.7	97.1
1911.0	2.55691	97.6	94.8	1935.0	2.56130	90.8	94.6	1959.0	2.56581	98.6	97.1
1911.2	2.55678	97.7	94.9	1935.2	2.56117	91.2	94.2	1959.2	2.56568	98.8	97.0
1911.4	2.55665	97.7	95.0	1935.4	2.56104	97.4	95.7	1959.4	2.56555	97.0	97.8
1911.6	2.55652	97.7	95.0	1935.6	2.56091	97.9	96.2	1959.6	2.56542	97.6	96.0
1911.8	2.55639	97.4	94.9	1935.8	2.56078	96.1	96.4	1959.8	2.56529	98.1	97.0
1912.0	2.55626	97.5	94.9	1936.0	2.56065	96.4	96.6	1960.0	2.56516	98.4	97.1
1912.2	2.55613	97.4	94.8	1936.2	2.56052	96.4	96.8				
1912.4	2.55600	97.3	94.5	1936.4	2.56039	96.6	96.8				
1912.6	2.55587	97.1	94.9	1936.6	2.56026	96.7	97.0				
1912.8	2.55574	97.1	95.6	1936.8	2.56013	96.7	97.0				
1913.0	2.55561	97.3	96.6	1937.0	2.56000	96.8	96.9				
1913.2	2.55548	97.2	96.5	1937.2	2.55987	96.5	96.6				
1913.4	2.55535	97.2	96.5	1937.4	2.55974	96.2	96.8				
1913.6	2.55522	97.0	96.4	1937.6	2.55961	96.2	96.8				
1913.8	2.55509	97.0	96.4	1937.8	2.55948	97.1	96.5				
1914.0	2.55496	96.8	96.0	1938.0	2.55935	96.5	96.6				
1914.2	2.55483	96.4	95.5	1938.2	2.55922	96.4	96.5				
1914.4	2.55470	96.4	95.5	1938.4	2.55909	96.4	96.5				
1914.6	2.55457	96.1	95.0	1938.6	2.55896	96.4	96.5				
1914.8	2.55444	97.7	97.7	1938.8	2.55883	96.4	96.5				
1915.0	2.55431	96.3	96.7	1939.0	2.55870	97.0	96.7				
1915.2	2.55418	96.4	96.7	1939.2	2.55857	97.2	96.8				
1915.4	2.55405	96.4	96.7	1939.4	2.55844	97.0	96.9				
1915.6	2.55392	96.7	97.3	1939.6	2.55831	97.0	96.8				
1915.8	2.55379	96.7	97.3	1939.8	2.55818	97.0	96.8				
1916.0	2.55366	96.8	96.1	1940.0	2.55805	97.0	96.8				
1916.2	2.55353	96.8	96.1	1940.2	2.55792	97.1	96.6				
1916.4	2.55340	96.8	96.1	1940.4	2.55779	97.1	96.6				
1916.6	2.55327	96.8	96.1	1940.6	2.55766	97.1	96.6				
1916.8	2.55314	96.8	96.1	1940.8	2.55753	97.1	96.6				
1917.0	2.55301	96.8	96.1	1941.0	2.55740	97.1	96.6				
1917.2	2.55288	96.8	96.1	1941.2	2.55727	97.1	96.6				
1917.4	2.55275	96.8	96.1	1941.4	2.55714	97.1	96.6				
1917.6	2.55262	96.8	96.1	1941.6	2.55701	97.1	96.6				
1917.8	2.55249	96.8	96.1	1941.8	2.55688	97.1	96.6				
1918.0	2.55236	96.8	96.1	1942.0	2.55675	97.1	96.6				
1918.2	2.55223	96.8	96.1	1942.2	2.55662	97.1	96.6				
1918.4	2.55210	96.8	96.1	1942.4	2.55649	97.1	96.6				
1918.6	2.55197	96.8	96.1	1942.6	2.55636	97.1	96.6				
1918.8	2.55184	96.8	96.1	1942.8	2.55623	97.1	96.6				
1919.0	2.55171	96.8	96.1	1943.0	2.55610	97.1	96.6				
1919.2	2.55158	96.8	96.1	1943.2	2.55597	97.1	96.6				
1919.4	2.55145	96.8	96.1	1943.4	2.55584	97.1	96.6	</			

Table 5-9 $\int_{\nu}^{\nu} A(\nu) d\nu$ [illegible]

Table 5-9 $\int A(\nu) d\nu$ (cont'd)

Wavelength (μ)	11	12	Wavelength (μ)	13	14	Wavelength (μ)	15	16	Wavelength (μ)	17	18
P_{total}	1.26	1.26	P_{total}	1.26	1.26	P_{total}	1.26	1.26	P_{total}	1.26	1.26
P_{refl}	1.02	1.02	P_{refl}	1.02	1.02	P_{refl}	1.02	1.02	P_{refl}	1.02	1.02
ϵ (cm ⁻¹)	0.0	0.0	ϵ (cm ⁻¹)	0.0	0.0	ϵ (cm ⁻¹)	0.0	0.0	ϵ (cm ⁻¹)	0.0	0.0
	$\times 10^{-4}$	$\times 10^{-4}$		$\times 10^{-4}$	$\times 10^{-4}$		$\times 10^{-4}$	$\times 10^{-4}$		$\times 10^{-4}$	$\times 10^{-4}$
1777.5	75.756	82.655	1875.0	91.911	100.000	1972.5	115.661	125.671	2070.0	127.260	140.671
1778.0	75.816	82.555	1875.5	92.020	101.000	1973.0	115.760	125.567	2070.5	127.361	140.572
1778.5	75.876	82.456	1876.0	92.129	101.210	1973.5	115.859	125.465	2071.0	127.462	140.473
1779.0	75.936	82.357	1876.5	92.238	101.420	1974.0	115.958	125.362	2071.5	127.563	140.374
1779.5	76.000	82.258	1877.0	92.347	101.630	1974.5	116.057	125.259	2072.0	127.664	140.275
1780.0	76.064	82.159	1877.5	92.456	101.840	1975.0	116.156	125.156	2072.5	127.765	140.176
1780.5	76.128	82.060	1878.0	92.565	102.050	1975.5	116.255	125.053	2073.0	127.866	140.077
1781.0	76.192	81.961	1878.5	92.674	102.260	1976.0	116.354	124.950	2073.5	127.967	139.978
1781.5	76.256	81.862	1879.0	92.783	102.470	1976.5	116.453	124.847	2074.0	128.068	139.879
1782.0	76.320	81.763	1879.5	92.892	102.680	1977.0	116.552	124.744	2074.5	128.169	139.780
1782.5	76.384	81.664	1880.0	93.001	102.890	1977.5	116.651	124.641	2075.0	128.270	139.681
1783.0	76.448	81.565	1880.5	93.110	103.100	1978.0	116.750	124.538	2075.5	128.371	139.582
1783.5	76.512	81.466	1881.0	93.219	103.310	1978.5	116.849	124.435	2076.0	128.472	139.483
1784.0	76.576	81.367	1881.5	93.328	103.520	1979.0	116.948	124.332	2076.5	128.573	139.384
1784.5	76.640	81.268	1882.0	93.437	103.730	1979.5	117.047	124.229	2077.0	128.674	139.285
1785.0	76.704	81.169	1882.5	93.546	103.940	1980.0	117.146	124.126	2077.5	128.775	139.186
1785.5	76.768	81.070	1883.0	93.655	104.150	1980.5	117.245	124.023	2078.0	128.876	139.087
1786.0	76.832	80.971	1883.5	93.764	104.360	1981.0	117.344	123.920	2078.5	128.977	138.988
1786.5	76.896	80.872	1884.0	93.873	104.570	1981.5	117.443	123.817	2079.0	129.078	138.889
1787.0	76.960	80.773	1884.5	93.982	104.780	1982.0	117.542	123.714	2079.5	129.179	138.790
1787.5	77.024	80.674	1885.0	94.091	104.990	1982.5	117.641	123.611	2080.0	129.280	138.691
1788.0	77.088	80.575	1885.5	94.200	105.200	1983.0	117.740	123.508	2080.5	129.381	138.592
1788.5	77.152	80.476	1886.0	94.309	105.410	1983.5	117.839	123.405	2081.0	129.482	138.493
1789.0	77.216	80.377	1886.5	94.418	105.620	1984.0	117.938	123.302	2081.5	129.583	138.394
1789.5	77.280	80.278	1887.0	94.527	105.830	1984.5	118.037	123.199	2082.0	129.684	138.295
1790.0	77.344	80.179	1887.5	94.636	106.040	1985.0	118.136	123.096	2082.5	129.785	138.196
1790.5	77.408	80.080	1888.0	94.745	106.250	1985.5	118.235	122.993	2083.0	129.886	138.097
1791.0	77.472	79.981	1888.5	94.854	106.460	1986.0	118.334	122.890	2083.5	129.987	137.998
1791.5	77.536	79.882	1889.0	94.963	106.670	1986.5	118.433	122.787	2084.0	130.088	137.899
1792.0	77.600	79.783	1889.5	95.072	106.880	1987.0	118.532	122.684	2084.5	130.189	137.800
1792.5	77.664	79.684	1890.0	95.181	107.090	1987.5	118.631	122.581	2085.0	130.290	137.701
1793.0	77.728	79.585	1890.5	95.290	107.300	1988.0	118.730	122.478	2085.5	130.391	137.602
1793.5	77.792	79.486	1891.0	95.399	107.510	1988.5	118.829	122.375	2086.0	130.492	137.503
1794.0	77.856	79.387	1891.5	95.508	107.720	1989.0	118.928	122.272	2086.5	130.593	137.404
1794.5	77.920	79.288	1892.0	95.617	107.930	1989.5	119.027	122.169	2087.0	130.694	137.305
1795.0	77.984	79.189	1892.5	95.726	108.140	1990.0	119.126	122.066	2087.5	130.795	137.206
1795.5	78.048	79.090	1893.0	95.835	108.350	1990.5	119.225	121.963	2088.0	130.896	137.107
1796.0	78.112	78.991	1893.5	95.944	108.560	1991.0	119.324	121.860	2088.5	130.997	137.008
1796.5	78.176	78.892	1894.0	96.053	108.770	1991.5	119.423	121.757	2089.0	131.098	136.909
1797.0	78.240	78.793	1894.5	96.162	108.980	1992.0	119.522	121.654	2089.5	131.199	136.810
1797.5	78.304	78.694	1895.0	96.271	109.190	1992.5	119.621	121.551	2090.0	131.300	136.711
1798.0	78.368	78.595	1895.5	96.380	109.400	1993.0	119.720	121.448	2090.5	131.401	136.612
1798.5	78.432	78.496	1896.0	96.489	109.610	1993.5	119.819	121.345	2091.0	131.502	136.513
1799.0	78.496	78.397	1896.5	96.598	109.820	1994.0	119.918	121.242	2091.5	131.603	136.414
1799.5	78.560	78.298	1897.0	96.707	110.030	1994.5	120.017	121.139	2092.0	131.704	136.315
1800.0	78.624	78.199	1897.5	96.816	110.240	1995.0	120.116	121.036	2092.5	131.805	136.216
1800.5	78.688	78.100	1898.0	96.925	110.450	1995.5	120.215	120.933	2093.0	131.906	136.117
1801.0	78.752	78.001	1898.5	97.034	110.660	1996.0	120.314	120.830	2093.5	132.007	136.018
1801.5	78.816	77.902	1899.0	97.143	110.870	1996.5	120.413	120.727	2094.0	132.108	135.919
1802.0	78.880	77.803	1899.5	97.252	111.080	1997.0	120.512	120.624	2094.5	132.209	135.820
1802.5	78.944	77.704	1900.0	97.361	111.290	1997.5	120.611	120.521	2095.0	132.310	135.721
1803.0	79.008	77.605	1900.5	97.470	111.500	1998.0	120.710	120.418	2095.5	132.411	135.622
1803.5	79.072	77.506	1901.0	97.579	111.710	1998.5	120.809	120.315	2096.0	132.512	135.523
1804.0	79.136	77.407	1901.5	97.688	111.920	1999.0	120.908	120.212	2096.5	132.613	135.424
1804.5	79.200	77.308	1902.0	97.797	112.130	1999.5	121.007	120.109	2097.0	132.714	135.325
1805.0	79.264	77.209	1902.5	97.906	112.340	2000.0	121.106	120.006	2097.5	132.815	135.226
1805.5	79.328	77.110	1903.0	98.015	112.550	2000.5	121.205	119.903	2098.0	132.916	135.127
1806.0	79.392	77.011	1903.5	98.124	112.760	2001.0	121.304	119.800	2098.5	133.017	135.028
1806.5	79.456	76.912	1904.0	98.233	112.970	2001.5	121.403	119.697	2099.0	133.118	134.929
1807.0	79.520	76.813	1904.5	98.342	113.180	2002.0	121.502	119.594	2099.5	133.219	134.830
1807.5	79.584	76.714	1905.0	98.451	113.390	2002.5	121.601	119.491	2100.0	133.320	134.731
1808.0	79.648	76.615	1905.5	98.560	113.600	2003.0	121.700	119.388	2100.5	133.421	134.632
1808.5	79.712	76.516	1906.0	98.669	113.810	2003.5	121.799	119.285	2101.0	133.522	134.533
1809.0	79.776	76.417	1906.5	98.778	114.020	2004.0	121.898	119.182	2101.5	133.623	134.434
1809.5	79.840	76.318	1907.0	98.887	114.230	2004.5	121.997	119.079	2102.0	133.724	134.335
1810.0	79.904	76.219	1907.5	98.996	114.440	2005.0	122.096	118.976	2102.5	133.825	134.236
1810.5	79.968	76.120	1908.0	99.105	114.650	2005.5	122.195	118.873	2103.0	133.926	134.137
1811.0	80.032	76.021	1908.5	99.214	114.860	2006.0	122.294	118.770	2103.5	134.027	134.038
1811.5	80.096	75.922	1909.0	99.323	115.070	2006.5	122.393	118.667	2104.0	134.128	133.939
1812.0	80.160	75.823	1909.5	99.432	115.280	2007.0	122.492	118.564	2104.5	134.229	133.840
1812.5	80.224	75.724	1910.0	99.541	115.490	2007.5	122.591	118.461	2105.0	134.330	133.741
1813.0	80.288	75.625	1910.5	99.650	115.700	2008.0	122.690	118.358	2105.5	134.431	133.642
1813.5	80.352	75.526	1911.0	99.759	115.910	2008.5	122.789	118.255	2106.0	134.532	133.543
1814.0	80.416	75.427	1911.5	99.868	116.120	2009.0	122.888	118.152	2106.5	134.633	133.444
1814.5	80.480	75.328	1912.0	99.977	116.330	2009.5	122.987	118.049	2107.0	134.734	133.345
1815.0	80.544	75.229	1912.5	100.086	116.540	2010.0	123.086	117.946	2107.5	134.835	133.246
1815.5	80.608	75.130	1913.0	100.195	116.750	2010.5	123.185	117.843	2108.0	134.936	133.147
1816.0	80.672	75.031	1913.5	100.304	116.960	2011.0	123.284	117.740	2108.5	135.037	133.048
1816.5	80.736	74.932	1914.0	100.413	117.170	2011.5	123.383	117.637	2109.0	135.138	132.949
1817.0	80.800	7									

Table 5-10 $\frac{1}{v} \int_{-\infty}^{\infty} \ln T(v) dv$

Snn. No.			Snn. No.			Snn. No.			Snn. No.		
33			34			35			36		
p (atm)			p (atm)			p (atm)			p (atm)		
5.26 x 10 ⁻³			5.26 x 10 ⁻³			5.26 x 10 ⁻³			5.26 x 10 ⁻³		
P _r (atm)			P _r (atm)			P _r (atm)			P _r (atm)		
5.02 x 10 ⁰			5.02 x 10 ⁰			5.02 x 10 ⁰			5.02 x 10 ⁰		
u (gm/cm ³)			u (gm/cm ³)			u (gm/cm ³)			u (gm/cm ³)		
8.0 x 10 ⁻⁴			8.0 x 10 ⁻⁴			8.0 x 10 ⁻⁴			8.0 x 10 ⁻⁴		
v (cm ⁻¹)			v (cm ⁻¹)			v (cm ⁻¹)			v (cm ⁻¹)		
v ⁻¹ (cm ⁻¹)			v ⁻¹ (cm ⁻¹)			v ⁻¹ (cm ⁻¹)			v ⁻¹ (cm ⁻¹)		
3540.0	0.	0.	3592.5	1.2178819+004	1.1518520+004	3645.0	3.7621775+004	3.7526366+004	3697.5	8.1151780+004	8.2864551+004
3540.5	2.1135466+001	1.7864000+001	3593.0	1.2300157+004	1.1634008+004	3645.5	3.7580827+004	3.7523600+004	3698.0	8.1212710+004	8.2904832+004
3541.0	4.2170196+001	3.5696677+001	3593.5	1.2426530+004	1.1774162+004	3646.0	3.7809721+004	3.7652709+004	3698.5	8.1271819+004	8.3048716+004
3541.5	6.3167056+001	5.6107737+001	3594.0	1.2558003+004	1.1917805+004	3646.5	3.8194554+004	3.8067602+004	3699.0	8.1336782+004	8.3194534+004
3542.0	8.4156155+001	8.0753392+001	3594.5	1.2694576+004	1.2058780+004	3647.0	3.8709222+004	3.8627467+004	3699.5	8.1413171+004	8.3273004+004
3542.5	1.2403579+002	1.1280528+002	3595.0	1.2836149+004	1.2219465+004	3647.5	3.9311793+004	3.9214799+004	3700.0	8.1496599+004	8.3360431+004
3543.0	1.7633824+002	1.5561781+002	3595.5	1.3171193+004	1.2414400+004	3648.0	4.0391229+004	4.0266250+004	3700.5	8.1602977+004	8.3479684+004
3543.5	2.4146950+002	2.1064681+002	3596.0	1.3408118+004	1.2608277+004	3648.5	4.1702499+004	4.1526235+004	3701.0	8.1775500+004	8.3766375+004
3544.0	3.1718693+002	2.7575100+002	3596.5	1.3560118+004	1.2765071+004	3649.0	4.2114591+004	4.2188029+004	3701.5	8.2115689+004	8.4044450+004
3544.5	4.0147890+002	3.5157554+002	3597.0	1.3658861+004	1.2886292+004	3649.5	4.3608799+004	4.3214667+004	3702.0	8.2588412+004	8.4360877+004
3545.0	5.3904350+002	4.6373485+002	3597.5	1.3738996+004	1.2970934+004	3650.0	4.4525567+004	4.4175244+004	3702.5	8.2946391+004	8.4659141+004
3545.5	7.2738150+002	5.9767141+002	3598.0	1.3795314+004	1.3011770+004	3650.5	4.5365211+004	4.5028758+004	3703.0	8.3316733+004	8.4949504+004
3546.0	8.4056479+002	7.1760611+002	3598.5	1.3836140+004	1.3020449+004	3651.0	4.6267810+004	4.5811970+004	3703.5	8.3724990+004	8.5207165+004
3546.5	9.5282151+002	8.4301386+002	3599.0	1.4008636+004	1.3133204+004	3651.5	4.7054504+004	4.6497916+004	3704.0	8.4157143+004	8.5527126+004
3547.0	1.1875149+003	1.0766110+003	3599.5	1.4166119+004	1.3248977+004	3652.0	4.7589708+004	4.7042862+004	3704.5	8.4610792+004	8.5831079+004
3547.5	1.3550052+003	1.1717651+003	3600.0	1.4270505+004	1.3327334+004	3652.5	4.7893035+004	4.7450008+004	3705.0	8.5072832+004	8.6149687+004
3548.0	1.4381464+003	1.2580508+003	3600.5	1.4389850+004	1.3461448+004	3653.0	4.8100888+004	4.7766388+004	3705.5	8.5614720+004	8.6481654+004
3548.5	1.5039988+003	1.3199228+003	3601.0	1.4524230+004	1.3763181+004	3653.5	4.8265588+004	4.8026576+004	3706.0	8.6171098+004	8.6737327+004
3549.0	1.5533279+003	1.3687353+003	3601.5	1.4684832+004	1.3882438+004	3654.0	4.8410783+004	4.826512+004	3706.5	8.6805120+004	8.7492318+004
3549.5	1.5896406+003	1.4093349+003	3602.0	1.4777518+004	1.3985956+004	3654.5	4.8539762+004	4.8506796+004	3707.0	8.7515299+004	8.8066879+004
3550.0	1.6256372+003	1.4472769+003	3602.5	1.4887647+004	1.4078900+004	3655.0	4.8745555+004	4.8781672+004	3707.5	8.8305281+004	8.8727340+004
3550.5	1.6628281+003	1.4876624+003	3603.0	1.4936733+004	1.4164997+004	3655.5	4.9030858+004	4.9135100+004	3708.0	8.9155300+004	8.9499507+004
3551.0	1.7016626+003	1.5303168+003	3603.5	1.5003079+004	1.4244398+004	3656.0	4.9587776+004	4.9673646+004	3708.5	9.0044201+004	9.0791811+004
3551.5	1.7705334+003	1.5933600+003	3604.0	1.5036304+004	1.4318458+004	3656.5	5.0476904+004	5.0223167+004	3709.0	9.0982385+004	9.1761910+004
3552.0	1.8766696+003	1.6875670+003	3604.5	1.5104081+004	1.4392598+004	3657.0	5.1136929+004	5.0758499+004	3709.5	9.1973996+004	9.2616810+004
3552.5	2.0225773+003	1.7600246+003	3605.0	1.5161652+004	1.4473824+004	3657.5	5.1663896+004	5.1163036+004	3710.0	9.3008513+004	9.3579002+004
3553.0	2.1251310+003	1.8654487+003	3605.5	1.5229328+004	1.4570280+004	3658.0	5.2297877+004	5.1839510+004	3710.5	9.4079937+004	9.4527939+004
3553.5	2.1967654+003	1.9177440+003	3606.0	1.5319620+004	1.4683650+004	3658.5	5.1775216+004	5.1654844+004	3711.0	9.5180007+004	9.5600014+004
3554.0	2.2771910+003	1.9857611+003	3606.5	1.5474291+004	1.4865200+004	3659.0	5.1874280+004	5.1813059+004	3711.5	9.7357207+004	9.9555032+004
3554.5	2.3740136+003	2.0605044+003	3607.0	1.5761730+004	1.5100362+004	3659.5	5.1965034+004	5.1960085+004	3712.0	9.8220906+004	9.9233106+004
3555.0	2.3675588+003	2.0790610+003	3607.5	1.6081542+004	1.5374719+004	3660.0	5.2058336+004	5.2094895+004	3712.5	9.9374100+004	9.1000362+004
3555.5	2.3936247+003	2.1089176+003	3608.0	1.6321747+004	1.5664266+004	3660.5	5.2212101+004	5.2213400+004	3713.0	1.0167647+004	1.1701011+004
3556.0	2.4178785+003	2.1354205+003	3608.5	1.6625205+004	1.6039740+004	3661.0	5.2213400+004	5.2213400+004	3713.5	1.0678747+004	1.2238687+004
3556.5	2.4436290+003	2.1613686+003	3609.0	1.7287696+004	1.6592975+004	3661.5	5.2277850+004	5.2430008+004	3714.0	1.0938423+004	1.2623516+004
3557.0	2.4766134+003	2.1885934+003	3609.5	1.8118914+004	1.7200833+004	3662.0	5.2340021+004	5.2542058+004	3714.5	1.1542821+004	1.297955+004
3557.5	2.5131621+003	2.2176734+003	3610.0	1.8537398+004	1.7854800+004	3662.5	5.2400697+004	5.2663309+004	3715.0	1.1919674+004	1.3741305+004
3558.0	2.5439419+003	2.2466200+003	3610.5	1.8756569+004	1.7952074+004	3663.0	5.2460890+004	5.2744870+004	3715.5	1.1599113+004	1.3496000+004
3558.5	2.5724913+003	2.2766978+003	3611.0	1.8900955+004	1.8189394+004	3663.5	5.2521866+004	5.2848639+004	3716.0	1.1708389+004	1.3672009+004
3559.0	2.6037710+003	2.3111104+003	3611.5	1.9070100+004	1.8428192+004	3664.0	5.2584253+004	5.2955399+004	3716.5	1.1803100+004	1.3825540+004
3559.5	2.6472444+003	2.3766720+003	3612.0	1.9336579+004	1.8720575+004	3664.5	5.2649978+004	5.3068561+004	3717.0	1.1891435+004	1.3967716+004
3560.0	2.7263571+003	2.4947729+003	3612.5	1.9832009+004	1.9100291+004	3665.0	5.2720806+004	5.3186699+004	3717.5	1.1978297+004	1.4106893+004
3560.5	2.8297835+003	2.6046324+003	3613.0	2.0370853+004	1.9504117+004	3665.5	5.2799777+004	5.3227477+004	3718.0	1.2079777+004	1.4254841+004
3561.0	2.9011981+003	2.6844426+003	3613.5	2.0695644+004	1.9804095+004	3666.0	5.2893066+004	5.3472683+004	3718.5	1.2174444+004	1.4424573+004
3561.5	2.9577483+003	2.7227086+003	3614.0	2.0928655+004	2.0125478+004	3666.5	5.2995018+004	5.3661539+004	3719.0	1.2253400+004	1.4620904+004
3562.0	3.0158444+003	2.7691469+003	3614.5	2.1217331+004	2.0409069+004	3667.0	5.3121767+004	5.3853686+004	3719.5	1.2340538+004	1.4823121+004
3562.5	3.0817770+003	2.7638207+003	3615.0	2.1521668+004	2.0687006+004	3667.5	5.3290237+004	5.4114453+004	3720.0	1.2406696+004	1.5011391+004
3563.0	3.1701700+003	2.8442526+003	3615.5	2.1740162+004	2.0926773+004	3668.0	5.3556149+004	5.4400735+004	3720.5	1.2492803+004	1.5190011+004
3563.5	3.2691350+003	2.9331875+003	3616.0	2.1902031+004	2.1136156+004	3668.5	5.4025441+004	5.4927350+004	3721.0	1.2578706+004	1.5374946+004
3564.0	3.3811225+003	3.0337305+003	3616.5	2.2045530+004	2.1340622+004	3669.0	5.4724585+004	5.5508114+004	3721.5	1.2672720+004	1.5559563+004
3564.5	3.4844237+003	3.1457589+00									

Table 5-10 $\frac{1}{u} \int_{-\infty}^z \ln T(v) dz$ (cont'd)

Sam. No.	11	34	Sam. No.	11	34	Sam. No.	11	34	Sam. No.	11	34
P_1 (atm)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$	P_1 (atm)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$	P_1 (atm)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$	P_1 (atm)	5.26 $\times 10^{-1}$	5.26 $\times 10^{-1}$
P_2 (atm)	5.02 $\times 10^0$	1.002 $\times 10^0$	P_2 (atm)	5.02 $\times 10^0$	1.002 $\times 10^0$	P_2 (atm)	5.02 $\times 10^0$	1.002 $\times 10^0$	P_2 (atm)	5.02 $\times 10^0$	1.002 $\times 10^0$
u (cm ² /s)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	u (cm ² /s)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	u (cm ² /s)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$	u (cm ² /s)	8.0 $\times 10^{-4}$	8.0 $\times 10^{-4}$
v (cm ² /s)	1.3540 $\times 10^{-1}$	1.3540 $\times 10^{-1}$	v (cm ² /s)	1.3540 $\times 10^{-1}$	1.3540 $\times 10^{-1}$	v (cm ² /s)	1.3540 $\times 10^{-1}$	1.3540 $\times 10^{-1}$	v (cm ² /s)	1.3540 $\times 10^{-1}$	1.3540 $\times 10^{-1}$
3750.0	1.2783641+005	1.3787546+005	3802.5	1.5735571+005	1.6675777+005	3855.0	2.3857852+005	2.2050447+005	3907.5	2.4417824+005	2.5921447+005
3750.5	1.2800292+005	1.3800240+005	3803.0	1.5746024+005	1.6755671+005	3855.5	2.3916655+005	2.2137931+005	3908.0	2.4421939+005	2.5928818+005
3751.0	1.2817554+005	1.3815080+005	3803.5	1.5756477+005	1.6835565+005	3856.0	2.3975458+005	2.2213774+005	3908.5	2.4426054+005	2.5936189+005
3751.5	1.3022550+005	1.3619550+005	3804.0	1.5767113+005	1.6915459+005	3856.5	2.3995231+005	2.2252965+005	3909.0	2.4427324+005	2.5939764+005
3752.0	1.3222195+005	1.3751805+005	3804.5	1.5787541+005	1.6995353+005	3857.0	2.4035804+005	2.2279845+005	3909.5	2.4427999+005	2.5940076+005
3752.5	1.3395157+005	1.3889631+005	3805.0	1.5818439+005	1.6725071+005	3857.5	2.4076974+005	2.2309659+005	3910.0	2.4431348+005	2.5948027+005
3753.0	1.3524602+005	1.4002277+005	3805.5	1.5848870+005	1.6764176+005	3858.0	2.4095119+005	2.2337400+005	3910.5	2.4431886+005	2.5951534+005
3753.5	1.3575061+005	1.4058920+005	3806.0	1.5879064+005	1.6818110+005	3858.5	2.4109915+005	2.2360244+005	3911.0	2.4431681+005	2.5954991+005
3754.0	1.3618353+005	1.4114770+005	3806.5	1.5908898+005	1.6875250+005	3859.0	2.4122758+005	2.2378400+005	3911.5	2.4431611+005	2.5958275+005
3754.5	1.3664780+005	1.4174955+005	3807.0	1.5938435+005	1.6935025+005	3859.5	2.4133525+005	2.2392924+005	3912.0	2.4431620+005	2.5961472+005
3755.0	1.3712405+005	1.4233241+005	3807.5	1.5967644+005	1.7026222+005	3860.0	2.4143328+005	2.2408118+005	3912.5	2.4431923+005	2.5964653+005
3755.5	1.3761308+005	1.4288175+005	3808.0	1.6010476+005	1.7087664+005	3860.5	2.4153097+005	2.2422258+005	3913.0	2.4431987+005	2.5967829+005
3756.0	1.3810208+005	1.4340252+005	3808.5	1.6054480+005	1.7132121+005	3861.0	2.4162870+005	2.2435377+005	3913.5	2.4432051+005	2.5971002+005
3756.5	1.3859108+005	1.4389788+005	3809.0	1.6098672+005	1.7164513+005	3861.5	2.4172643+005	2.2448481+005	3914.0	2.4432115+005	2.5974175+005
3757.0	1.3907956+005	1.4437511+005	3809.5	1.6143176+005	1.7189956+005	3862.0	2.4182416+005	2.2460585+005	3914.5	2.4432179+005	2.5977348+005
3757.5	1.3956804+005	1.4484031+005	3810.0	1.6187900+005	1.7210608+005	3862.5	2.4192189+005	2.2472689+005	3915.0	2.4432243+005	2.5980521+005
3758.0	1.4005652+005	1.4530551+005	3810.5	1.6232804+005	1.7227771+005	3863.0	2.4201962+005	2.2484793+005	3915.5	2.4432307+005	2.5983694+005
3758.5	1.4054500+005	1.4577071+005	3811.0	1.6277708+005	1.7240934+005	3863.5	2.4211735+005	2.2496897+005	3916.0	2.4432371+005	2.5986867+005
3759.0	1.4103348+005	1.4623591+005	3811.5	1.6322612+005	1.7254097+005	3864.0	2.4221508+005	2.2508991+005	3916.5	2.4432435+005	2.5990040+005
3759.5	1.4152196+005	1.4670111+005	3812.0	1.6367516+005	1.7267260+005	3864.5	2.4231281+005	2.2521095+005	3917.0	2.4432499+005	2.5993213+005
3760.0	1.4201044+005	1.4716631+005	3812.5	1.6412420+005	1.7279423+005	3865.0	2.4241054+005	2.2533199+005	3917.5	2.4432563+005	2.5996386+005
3760.5	1.4249892+005	1.4763151+005	3813.0	1.6457324+005	1.7291586+005	3865.5	2.4250827+005	2.2545303+005	3918.0	2.4432627+005	2.5999559+005
3761.0	1.4298740+005	1.4809671+005	3813.5	1.6502228+005	1.7303749+005	3866.0	2.4260600+005	2.2557407+005	3918.5	2.4432691+005	2.6002732+005
3761.5	1.4347588+005	1.4856191+005	3814.0	1.6547132+005	1.7315912+005	3866.5	2.4270373+005	2.2569511+005	3919.0	2.4432755+005	2.6005905+005
3762.0	1.4396436+005	1.4902711+005	3814.5	1.6592036+005	1.7328075+005	3867.0	2.4280146+005	2.2581615+005	3919.5	2.4432819+005	2.6009078+005
3762.5	1.4445284+005	1.4949231+005	3815.0	1.6636940+005	1.7340238+005	3867.5	2.4289919+005	2.2593719+005	3920.0	2.4432883+005	2.6012251+005
3763.0	1.4494132+005	1.4995751+005	3815.5	1.6681844+005	1.7352401+005	3868.0	2.4299692+005	2.2605823+005	3920.5	2.4432947+005	2.6015424+005
3763.5	1.4542980+005	1.5042271+005	3816.0	1.6726748+005	1.7364564+005	3868.5	2.4309465+005	2.2617927+005	3921.0	2.4433011+005	2.6018597+005
3764.0	1.4591828+005	1.5088791+005	3816.5	1.6771652+005	1.7376727+005	3869.0	2.4319238+005	2.2630031+005	3921.5	2.4433075+005	2.6021770+005
3764.5	1.4640676+005	1.5135311+005	3817.0	1.6816556+005	1.7388890+005	3869.5	2.4329011+005	2.2642135+005	3922.0	2.4433139+005	2.6024943+005
3765.0	1.4689524+005	1.5181831+005	3817.5	1.6861460+005	1.7401053+005	3870.0	2.4338784+005	2.2654239+005	3922.5	2.4433203+005	2.6028116+005
3765.5	1.4738372+005	1.5228351+005	3818.0	1.6906364+005	1.7413216+005	3870.5	2.4348557+005	2.2666343+005	3923.0	2.4433267+005	2.6031289+005
3766.0	1.4787220+005	1.5274871+005	3818.5	1.6951268+005	1.7425379+005	3871.0	2.4358330+005	2.2678447+005	3923.5	2.4433331+005	2.6034462+005
3766.5	1.4836068+005	1.5321391+005	3819.0	1.6996172+005	1.7437542+005	3871.5	2.4368103+005	2.2690551+005	3924.0	2.4433395+005	2.6037635+005
3767.0	1.4884916+005	1.5367911+005	3819.5	1.7041076+005	1.7449705+005	3872.0	2.4377876+005	2.2702655+005	3924.5	2.4433459+005	2.6040808+005
3767.5	1.4933764+005	1.5414431+005	3820.0	1.7085980+005	1.7461868+005	3872.5	2.4387649+005	2.2714759+005	3925.0	2.4433523+005	2.6043981+005
3768.0	1.4982612+005	1.5460951+005	3820.5	1.7130884+005	1.7474031+005	3873.0	2.4397422+005	2.2726863+005	3925.5	2.4433587+005	2.6047154+005
3768.5	1.5031460+005	1.5507471+005	3821.0	1.7175788+005	1.7486194+005	3873.5	2.4407195+005	2.2738967+005	3926.0	2.4433651+005	2.6050327+005
3769.0	1.5080308+005	1.5553991+005	3821.5	1.7220692+005	1.7498357+005	3874.0	2.4416968+005	2.2751071+005	3926.5	2.4433715+005	2.6053500+005
3769.5	1.5129156+005	1.5600511+005	3822.0	1.7265596+005	1.7510520+005	3874.5	2.4426741+005	2.2763175+005	3927.0	2.4433779+005	2.6056673+005
3770.0	1.5178004+005	1.5647031+005	3822.5	1.7310500+005	1.7522683+005	3875.0	2.4436514+005	2.2775279+005	3927.5	2.4433843+005	2.6059846+005
3770.5	1.5226852+005	1.5693551+005	3823.0	1.7355404+005	1.7534846+005	3875.5	2.4446287+005	2.2787383+005	3928.0	2.4433907+005	2.6063019+005
3771.0	1.5275700+005	1.5740071+005	3823.5	1.7400308+005	1.7547009+005	3876.0	2.4456060+005	2.2799487+005	3928.5	2.4433971+005	2.6066192+005
3771.5	1.5324548+005	1.5786591+005	3824.0	1.7445212+005	1.7559172+005	3876.5	2.4465833+005	2.2811591+005	3929.0	2.4434035+005	2.6069365+005
3772.0	1.5373396+005	1.5833111+005	3824.5	1.7490116+005	1.7571335+005	3877.0	2.4475606+005	2.2823695+005	3929.5	2.4434099+005	2.6072538+005
3772.5	1.5422244+005	1.5879631+005	3825.0	1.7535020+005	1.7583498+005	3877.5	2.4485379+005	2.2835799+005	3930.0	2.4434163+005	2.6075711+005
3773.0	1.5471092+005	1.5926151+005	3825.5	1.7579924+005	1.7595661+005	3878.0	2.4495152+005	2.2847903+005	3930.5	2.4434227+005	2.6078884+005
3773.5	1.5520040+005	1.5972671+005	3826.0	1.7624828+005	1.7607824+005	3878.5	2.4504925+005	2.2860007+005	3931.0	2.4434291+005	2.6082057+005
3774.0	1.5568888+005	1.6019191+005	3826.5	1.7669732+005	1.7620000+005	3879.0	2.4514698+005	2.2872111+005	3931.5	2.4434355+005	2.6085230+005
3774.5	1.5617736+005	1.6065711+005	3827.0	1.7714636+005	1.7632163+005	3879.5	2.4524471+005	2.2884215+005	3932.0	2.4434419+005	2.6088403+005
3775.0	1.5666584+005	1.6112231+005	3827.5	1.7759540+005	1.7644326+005	3880.0	2.4534244+005	2.2896319+005	3932.5	2.4434483+005	2.6091576+005
3775.5	1.5715432+005	1.6158751+005	3828.0	1.7804444+005	1.7656489+005	3880.5	2.4544017+005	2.2908423+005	3933.0	2.4434547+005	2.6094749+005
3776.0	1.5764280+005	1.6205271+005	3828.5	1.7849348+005	1.7668652+005	3881.0	2.4553790+005	2.2920527+005	3933.5	2.4434611+005	2.6097922+005
3776.5	1.5813128+005	1.6251791+005	3829.0	1.7894252+005	1.7680815+005	3881.5	2.4563563+005	2.2932631+005	3934.0	2.4434675+005	2.6101095+005
3777.0	1.5861976+005	1.6298311+005	3829.5	1.7939156+005	1.7692978+005	3882.0	2.4573336+005	2.2944735+005	3934.5	2.4434739+005	2.6104268+005
3777.5	1.5910824+005	1.6344831+005	3830.0	1.7984060+005	1.7705141+005	3882.5	2.4583109+005	2.2956839+005	3935.0	2.4434803+005	2.6107441+005
3778.0	1.5959672+005	1.6391351+005	3830.5	1.8028964+005	1.7717304+005	3883.0	2.4592882+005	2.2968943+005	3935.5	2.4434867+005	2.6110614+005
3778.5	1.6008520+005	1.64									

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[illegible]

Table 5-11 (Cont'd)

Sam. No.	Y	X	Sam. No.	Y	X	Sam. No.	Y	X	Sam. No.	Y	X
p (atm)	8.42 $\times 10^{-9}$	8.42 $\times 10^{-9}$	p (atm)	8.42 $\times 10^{-9}$	8.42 $\times 10^{-9}$	p (atm)	8.42 $\times 10^{-9}$	8.42 $\times 10^{-9}$	p (atm)	8.42 $\times 10^{-9}$	8.42 $\times 10^{-9}$
P _g (atm)	5.03 $\times 10^3$	1.003 $\times 10^3$	P _g (atm)	5.03 $\times 10^3$	1.003 $\times 10^3$	P _g (atm)	5.03 $\times 10^3$	1.003 $\times 10^3$	P _g (atm)	5.03 $\times 10^3$	1.003 $\times 10^3$
u (g/cm ³)	2.05 $\times 10^{-9}$	2.05 $\times 10^{-9}$	u (g/cm ³)	2.05 $\times 10^{-9}$	2.05 $\times 10^{-9}$	u (g/cm ³)	2.05 $\times 10^{-9}$	2.05 $\times 10^{-9}$	u (g/cm ³)	2.05 $\times 10^{-9}$	2.05 $\times 10^{-9}$
Y	X	Y	X	Y	X	Y	X	Y	X	Y	X
(mm ²)	(microns)	(mm ²)	(microns)	(mm ²)	(microns)	(mm ²)	(microns)	(mm ²)	(microns)	(mm ²)	(microns)
4055.0	2.44609	94.6	94.2	4079.0	2.45158	77.1	84.6	4153.0	2.45724	93.0	93.8
4055.2	2.44617	94.6	94.0	4079.2	2.45166	77.1	83.4	4153.2	2.45732	92.5	92.8
4055.4	2.44619	94.6	93.7	4079.4	2.45174	77.1	82.3	4153.4	2.45740	92.2	92.5
4055.6	2.44621	94.6	93.7	4079.6	2.45182	76.6	81.6	4153.6	2.45748	91.5	91.1
4055.8	2.44623	94.6	93.9	4079.8	2.45190	76.0	82.3	4153.8	2.45756	91.2	90.2
4056.0	2.44625	95.7	93.6	4080.0	2.45198	87.0	82.6	4154.0	2.45764	86.2	79.1
4056.2	2.44627	95.3	93.7	4080.2	2.45206	86.4	83.6	4154.2	2.45772	84.2	87.5
4056.4	2.44629	95.2	94.2	4080.4	2.45214	85.5	84.8	4154.4	2.45780	82.5	86.6
4056.6	2.44631	94.7	93.8	4080.6	2.45222	86.2	86.0	4154.6	2.45788	81.6	85.6
4056.8	2.44633	94.7	93.6	4080.8	2.45230	85.9	86.5	4154.8	2.45796	80.5	84.0
4057.0	2.44635	94.8	93.4	4081.0	2.45238	85.3	87.1	4155.0	2.45804	79.3	82.7
4057.2	2.44637	94.5	93.2	4081.2	2.45246	85.7	87.5	4155.2	2.45812	78.1	81.4
4057.4	2.44639	94.1	93.2	4081.4	2.45254	85.3	87.9	4155.4	2.45820	77.0	80.1
4057.6	2.44641	93.1	93.2	4081.6	2.45262	86.3	89.1	4155.6	2.45828	76.0	78.8
4057.8	2.44643	92.3	92.9	4081.8	2.45270	90.0	89.8	4155.8	2.45836	65.6	77.0
4058.0	2.44645	92.9	92.4	4082.0	2.45278	91.7	90.0	4156.0	2.45844	63.3	75.4
4058.2	2.44647	93.0	92.3	4082.2	2.45286	92.5	91.3	4156.2	2.45852	65.5	76.7
4058.4	2.44649	93.3	92.1	4082.4	2.45294	93.0	91.9	4156.4	2.45860	70.7	75.1
4058.6	2.44651	93.3	91.7	4082.6	2.45302	92.5	92.0	4156.6	2.45868	71.0	77.0
4058.8	2.44653	93.3	91.8	4082.8	2.45310	93.4	92.5	4156.8	2.45876	82.2	79.7
4059.0	2.44655	92.2	91.0	4083.0	2.45318	93.7	93.2	4157.0	2.45884	85.3	82.1
4059.2	2.44657	91.3	90.2	4083.2	2.45326	93.9	93.2	4157.2	2.45892	84.3	84.7
4059.4	2.44659	89.3	89.8	4083.4	2.45334	93.7	91.5	4157.4	2.45900	80.4	86.8
4059.6	2.44661	87.6	88.6	4083.6	2.45342	95.9	93.5	4157.6	2.45908	91.4	88.6
4059.8	2.44663	84.9	87.6	4083.8	2.45350	93.4	93.1	4157.8	2.45916	92.4	90.0
4060.0	2.44665	81.5	86.3	4084.0	2.45358	93.2	93.0	4158.0	2.45924	92.0	90.9
4060.2	2.44667	78.9	85.4	4084.2	2.45366	92.7	93.5	4158.2	2.45932	92.9	91.5
4060.4	2.44669	78.1	86.6	4084.4	2.45374	92.2	92.5	4158.4	2.45940	92.7	92.7
4060.6	2.44671	80.2	86.7	4084.6	2.45382	91.4	92.4	4158.6	2.45948	93.3	92.7
4060.8	2.44673	83.6	85.3	4084.8	2.45390	91.4	92.2	4158.8	2.45956	93.3	92.7
4061.0	2.44675	86.3	86.1	4085.0	2.45398	91.9	92.2	4159.0	2.45964	92.9	93.1
4061.2	2.44677	88.4	87.3	4085.2	2.45406	90.9	91.4	4159.2	2.45972	92.2	93.3
4061.4	2.44679	90.1	88.5	4085.4	2.45414	90.7	91.3	4159.4	2.45980	91.8	93.5
4061.6	2.44681	92.0	89.2	4085.6	2.45422	89.0	90.8	4159.6	2.45988	91.6	92.9
4061.8	2.44683	93.1	90.4	4085.8	2.45430	87.8	90.4	4159.8	2.45996	92.7	93.3
4062.0	2.44685	93.4	90.6	4086.0	2.45438	87.1	89.8	4160.0	2.46004	93.5	93.5
4062.2	2.44687	93.8	91.3	4086.2	2.45446	87.4	89.3	4160.2	2.46012	94.0	94.0
4062.4	2.44689	94.2	92.4	4086.4	2.45454	87.5	88.5	4160.4	2.46020	94.1	94.6
4062.6	2.44691	94.5	93.1	4086.6	2.45462	88.4	88.9	4160.6	2.46028	95.0	95.1
4062.8	2.44693	94.9	93.2	4086.8	2.45470	88.6	88.7	4160.8	2.46036	96.6	95.4
4063.0	2.44695	94.7	93.4	4087.0	2.45478	88.7	89.3	4161.0	2.46044	96.6	95.4
4063.2	2.44697	94.9	93.7	4087.2	2.45486	89.1	89.5	4161.2	2.46052	97.1	97.5
4063.4	2.44699	94.9	94.0	4087.4	2.45494	89.9	90.3	4161.4	2.46060	97.4	97.4
4063.6	2.44701	94.9	94.2	4087.6	2.45502	90.2	90.6	4161.6	2.46068	97.4	97.4
4063.8	2.44703	95.5	94.4	4087.8	2.45510	90.2	90.6	4161.8	2.46076	97.4	97.4
4064.0	2.44705	95.2	94.6	4088.0	2.45518	90.3	91.6	4162.0	2.46084	95.1	96.0
4064.2	2.44707	95.7	94.7	4088.2	2.45526	90.6	92.0	4162.2	2.46092	95.7	96.0
4064.4	2.44709	96.7	94.7	4088.4	2.45534	90.7	91.0	4162.4	2.46100	96.2	96.1
4064.6	2.44711	95.7	94.4	4088.6	2.45542	90.8	90.2	4162.6	2.46108	96.8	95.9
4064.8	2.44713	95.6	94.7	4088.8	2.45550	90.4	89.6	4162.8	2.46116	95.8	95.9
4065.0	2.44715	95.9	95.0	4089.0	2.45558	88.4	88.8	4163.0	2.46124	95.4	96.2
4065.2	2.44717	96.1	95.1	4089.2	2.45566	87.7	87.9	4163.2	2.46132	95.7	96.1
4065.4	2.44719	96.1	95.8	4089.4	2.45574	90.7	89.9	4163.4	2.46140	95.7	96.4
4065.6	2.44721	96.6	96.7	4089.6	2.45582	91.8	90.6	4163.6	2.46148	96.2	95.9
4065.8	2.44723	96.9	96.7	4089.8	2.45590	90.8	90.7	4163.8	2.46156	96.8	96.1
4066.0	2.44725	96.7	96.0	4090.0	2.45598	91.5	91.7	4164.0	2.46164	96.0	96.7
4066.2	2.44727	96.9	94.9	4090.2	2.45606	92.6	92.5	4164.2	2.46172	96.1	96.3
4066.4	2.44729	96.1	95.1	4090.4	2.45614	91.2	91.2	4164.4	2.46180	96.1	96.1
4066.6	2.44731	96.0	95.1	4090.6	2.45622	90.2	91.9	4164.6	2.46188	95.9	95.9
4066.8	2.44733	96.3	95.4	4090.8	2.45630	90.3	93.0	4164.8	2.46196	95.9	96.3
4067.0	2.44735	96.0	95.3	4091.0	2.45638	90.3	94.7	4165.0	2.46204	96.1	96.5
4067.2	2.44737	96.0	95.3	4091.2	2.45646	90.4	94.7	4165.2	2.46212	96.3	96.2
4067.4	2.44739	96.0	95.5	4091.4	2.45654	90.4	94.6	4165.4	2.46220	96.3	96.2
4067.6	2.44741	96.0	95.5	4091.6	2.45662	90.4	94.6	4165.6	2.46228	96.3	96.2
4067.8	2.44743	96.0	95.5	4091.8	2.45670	90.4	94.6	4165.8	2.46236	96.3	96.2
4068.0	2.44745	96.0	95.5	4092.0	2.45678	90.4	94.6	4166.0	2.46244	96.3	96.2
4068.2	2.44747	96.0	95.5	4092.2	2.45686	90.4	94.6	4166.2	2.46252	96.3	96.2
4068.4	2.44749	96.0	95.5	4092.4	2.45694	90.4	94.6	4166.4	2.46260	96.3	96.2
4068.6	2.44751	96.0	95.5	4092.6	2.45702	90.4	94.6	4166.6	2.46268	96.3	96.2
4068.8	2.44753	96.0	95.5	4092.8	2.45710	90.4	94.6	4166.8	2.46276	96.3	96.2
4069.0	2.44755	96.0	95.5	4093.0	2.45718	90.4	94.6	4167.0	2.46284	96.3	96.2
4069.2	2.44757	96.0	95.5	4093.2	2.45726	90.4	94.6	4167.2	2.46292	96.3	96.2
4069.4	2.44759	96.0	95.5	4093.4	2.45734	90.4	94.6	4167.4	2.46300	96.3	96.2
4069.6	2.44761	96.0	95.5	4093.6	2.45742	90.4	94.6	4167.6	2.46308	96.3	96.2
4069.8	2.44763	96.0	95.5	4093.8	2.45750	90.4	94.6	4167.8	2.46316	96.3	96.2
4070.0	2.44765	96.0	95.5	4094.0	2.45758	90.4	94.6	4168.0	2.46324	96.3	96.2
4070.2	2.44767	96.0	95.5	4094.2	2.45766	90.4	94.6	4168.2	2.46332	96.3	96.2
4070.4	2.44769	96.0	95.5	4094.4	2.45774	90.4	94.6	4168.4	2.46340	96.3	96.2
4070.6	2.44771	96.0	95.5	4094.6	2.45782	90.4	94.6	4168.6	2.46348	96.3	96.2
4070.8	2.44773	96.0	95.5	4094.8	2.45790	90.4	94.6	4168.8	2.46356	96.3	96.2
4071.0	2.44775	96.0	95.5	4095.0	2.45798	90.4	94.6	4169.0	2.46364	96.3	96.2
4071.2	2.44777	96.0	95.5	4095.2	2.45806	90.4	94.6	4169.2	2.46372	96.3	96.2
4071.4	2.44779	96.0	95.5	4095.4	2.45814	90.4	94.6	4169.4	2.46380	96.3	96.2
4071.6	2.44781	96.0	95.5	4095.6	2.45822	90.4	94.6	4169.6	2.46388	96.3	96.2
4071.8	2.44783	96.0	95.5	4095.8	2.45830	90.4	94.6	4169.8	2.46396	96.3	96.2
4072.0	2.44785	96.0	95.5	4096.0	2.45838	90.4	94.6	4170.0	2.46404	96.3	96.2
4072.2	2.44787	96.0	95.5	4096.2	2.45846	90.4	94.6	4170.2	2.46412	96.3	96.2
4072.4	2.44789	96.0	95.5	4096.4	2.45854	90.4	94.6	4170.4	2.46420	96.3	96.2

Table 5-12 $\int A(z) dz$

Sms. No.			Sms. No.			Sms. No.			Sms. No.		
35			36			35			36		
$p(\text{atm})$			$p(\text{atm})$			$p(\text{atm})$			$p(\text{atm})$		
$\rho(\text{g/cm}^3)$			$\rho(\text{g/cm}^3)$			$\rho(\text{g/cm}^3)$			$\rho(\text{g/cm}^3)$		
$u(\text{g/cm}^2)$			$u(\text{g/cm}^2)$			$u(\text{g/cm}^2)$			$u(\text{g/cm}^2)$		
v			v			v			v		
$v^{\circ}3933$			$v^{\circ}3933$			$v^{\circ}3933$			$v^{\circ}3933$		
$v^{\circ}3933$			$v^{\circ}3933$			$v^{\circ}3933$			$v^{\circ}3933$		
3935.0	0.	0.	3987.5	26.286	29.450	4040.0	35.219	39.757	4092.5	40.787	44.920
3935.5	0.289	0.381	3988.0	26.343	29.534	4040.5	35.556	39.799	4093.0	40.812	44.942
3936.0	0.532	0.722	3988.5	26.402	29.625	4041.0	35.590	39.843	4093.5	40.840	44.967
3936.5	0.742	1.034	3989.0	26.473	29.722	4041.5	35.676	39.888	4094.0	40.867	44.991
3937.0	0.942	1.331	3989.5	26.550	29.832	4042.0	35.664	39.937	4094.5	40.892	45.010
3937.5	1.150	1.629	3990.0	26.793	30.045	4042.5	35.716	39.997	4095.0	40.915	45.028
3938.0	1.436	1.949	3990.5	27.036	30.273	4043.0	35.764	40.073	4095.5	40.936	45.047
3938.5	1.777	2.301	3991.0	27.308	30.517	4043.5	35.804	40.172	4096.0	40.957	45.065
3939.0	2.103	2.667	3991.5	27.507	30.776	4044.0	36.034	40.299	4096.5	40.978	45.082
3939.5	2.396	3.022	3992.0	27.632	30.894	4044.5	36.260	40.459	4097.0	41.000	45.100
3940.0	2.659	3.379	3992.5	27.749	31.046	4045.0	36.516	40.645	4097.5	41.021	45.117
3940.5	2.945	3.727	3993.0	27.882	31.183	4045.5	36.735	40.833	4098.0	41.043	45.134
3941.0	3.272	4.113	3993.5	27.986	31.331	4046.0	36.865	40.963	4098.5	41.064	45.150
3941.5	3.648	4.535	3994.0	28.099	31.669	4046.5	36.942	41.094	4099.0	41.086	45.166
3942.0	4.092	4.966	3994.5	28.275	31.628	4047.0	36.995	41.173	4099.5	41.105	45.181
3942.5	4.574	5.400	3995.0	28.532	31.622	4047.5	37.038	41.234	4100.0	41.128	45.197
3943.0	5.064	5.975	3995.5	28.767	32.027	4048.0	37.075	41.288	4100.5	41.153	45.215
3943.5	5.539	6.467	3996.0	28.989	32.199	4048.5	37.107	41.332	4101.0	41.177	45.232
3944.0	5.991	6.966	3996.5	29.098	32.332	4049.0	37.137	41.372	4101.5	41.200	45.251
3944.5	6.421	7.407	3997.0	29.069	32.430	4049.5	37.165	41.409	4102.0	41.230	45.272
3945.0	6.770	7.837	3997.5	29.128	32.529	4050.0	37.193	41.444	4102.5	41.260	45.293
3945.5	7.067	8.224	3998.0	29.175	32.604	4050.5	37.222	41.480	4103.0	41.282	45.324
3946.0	7.307	8.589	3998.5	29.220	32.677	4051.0	37.255	41.517	4103.5	41.334	45.364
3946.5	7.486	8.966	3999.0	29.269	32.747	4051.5	37.288	41.553	4104.0	41.393	45.408
3947.0	8.011	9.396	3999.5	29.311	32.814	4052.0	37.320	41.592	4104.5	41.474	45.471
3947.5	8.488	9.877	4000.0	29.352	32.877	4052.5	37.378	41.635	4105.0	41.570	45.549
3948.0	8.971	10.370	4000.5	29.397	32.941	4053.0	37.422	41.678	4105.5	41.683	45.644
3948.5	9.432	10.855	4001.0	29.440	33.077	4053.5	37.455	41.716	4106.0	41.804	45.756
3949.0	9.863	11.324	4001.5	29.501	33.076	4054.0	37.482	41.750	4106.5	41.811	45.809
3949.5	10.321	11.787	4002.0	29.540	33.142	4054.5	37.508	41.782	4107.0	41.899	45.886
3950.0	10.802	12.250	4002.5	29.596	33.208	4055.0	37.533	41.814	4107.5	41.966	45.960
3950.5	11.273	12.725	4003.0	29.677	33.297	4055.5	37.559	41.844	4108.0	42.204	46.112
3951.0	11.684	13.170	4003.5	29.752	33.393	4056.0	37.586	41.875	4108.5	42.261	46.154
3951.5	12.009	13.646	4004.0	29.809	33.481	4056.5	37.607	41.906	4109.0	42.275	46.190
3952.0	12.288	13.922	4004.5	29.856	33.553	4057.0	37.633	41.937	4109.5	42.314	46.224
3952.5	12.506	14.255	4005.0	29.917	33.629	4057.5	37.661	41.971	4110.0	42.352	46.250
3953.0	12.634	14.587	4005.5	29.980	33.711	4058.0	37.696	42.006	4110.5	42.382	46.287
3953.5	13.279	14.918	4006.0	30.056	33.775	4058.5	37.730	42.045	4111.0	42.408	46.311
3954.0	13.562	15.226	4006.5	30.122	33.808	4059.0	37.765	42.080	4111.5	42.432	46.333
3954.5	13.745	15.500	4007.0	30.207	33.991	4059.5	37.812	42.136	4112.0	42.454	46.355
3955.0	13.948	15.754	4007.5	30.136	34.110	4060.0	37.885	42.197	4112.5	42.476	46.375
3955.5	14.147	16.000	4008.0	30.131	34.275	4060.5	37.908	42.271	4113.0	42.498	46.396
3956.0	14.383	16.244	4008.5	30.001	34.475	4061.0	37.975	42.345	4113.5	42.510	46.414
3956.5	14.566	16.540	4009.0	31.055	34.686	4061.5	38.131	42.407	4114.0	42.539	46.433
3957.0	14.899	16.866	4009.5	31.215	34.872	4062.0	38.167	42.457	4114.5	42.559	46.453
3957.5	15.278	17.154	4010.0	31.314	35.019	4062.5	38.198	42.499	4115.0	42.579	46.471
3958.0	15.540	17.445	4010.5	31.393	35.130	4063.0	38.224	42.533	4115.5	42.590	46.490
3958.5	15.799	17.720	4011.0	31.462	35.241	4063.5	38.249	42.564	4116.0	42.617	46.508
3959.0	16.086	17.973	4011.5	31.531	35.350	4064.0	38.273	42.593	4116.5	42.637	46.526
3959.5	16.265	18.225	4012.0	31.611	35.453	4064.5	38.296	42.619	4117.0	42.656	46.543
3960.0	16.468	18.483	4012.5	31.717	35.554	4065.0	38.317	42.645	4117.5	42.675	46.559
3960.5	16.659	18.723	4013.0	31.820	35.659	4065.5	38.337	42.670	4118.0	42.695	46.576
3961.0	16.895	19.000	4013.5	31.893	35.734	4066.0	38.359	42.696	4118.5	42.715	46.593
3961.5	17.272	19.318	4014.0	31.954	35.822	4066.5	38.381	42.721	4119.0	42.734	46.609
3962.0	17.697	19.779	4014.5	32.014	35.906	4067.0	38.400	42.745	4119.5	42.752	46.626
3962.5	17.975	20.172	4015.0	32.070	35.980	4067.5	38.420	42.767	4120.0	42.772	46.644
3963.0	18.161	20.441	4015.5	32.126	36.054	4068.0	38.442	42.790	4120.5	42.790	46.660
3963.5	18.319	20.687	4016.0	32.179	36.127	4068.5	38.464	42.813	4121.0	42.807	46.675
3964.0	18.450	20.834	4016.5	32.230	36.205	4069.0	38.485	42.835	4121.5	42.821	46.690
3964.5	18.602	21.000	4017.0	32.314	36.294	4069.5	38.507	42.859	4122.0	42.842	46.705
3965.0	18.749	21.174	4017.5	32.390	36.384	4070.0	38.529	42.883	4122.5	42.865	46.720
3965.5	18.860	21.367	4018.0	32.462	36.472	4070.5	38.552	42.906	4123.0	42.877	46.734
3966.0	18.950	21.564	4018.5	32.567	36.573	4071.0	38.575	42.929	4123.5	42.894	46.749
3966.5	19.036	21.762	4019.0	32.699	36.672	4071.5	38.598	42.952	4124.0	42.908	46.763
3967.0	19.117	21.922	4019.5	32.877	36.826	4072.0	38.623	42.976	4124.5	42.929	46.778
3967.5	19.230	22.064	4020.0	33.036	36.949	4072.5	38.650	43.000	4125.0	42.943	46.792
3968.0	19.371	22.229	4020.5	33.140	37.0	4073.0	38.667	43.025	4125.5	42.957	46.806
3968.5	19.568	22.424	4021.0	33.210	37.091	4073.5	38.684	43.049	4126.0	42.971	46.820
3969.0	19.680	22.604	4021.5	33.280	37.201	4074.0	38.700	43.074	4126.5	42.985	46.834
3969.5	20.162	22.762	4022.0	33.305	37.372	4074.5	38.716	43.099	4127.0	42.999	46.848
3970.0	20.390	23.013	4022.5	33.394	37.460	4075.0	38.731	43.124	4127.5	43.013	46.862
3970.5	20.594	23.270	4023.0	33.641	37.510	4075.5	38.746	43.148	4128.0	43.027	46.876
3971.0	20.710	23.489	4023.5	33.694	37.560	4076.0	38.761	43.173	4128.5	43.041	46.890
3971.5	20.795	23.690	4024.0	33.750	37.609	4076.5	38.776	43.197	4129.0	43.055	46.904
3972.0	21.174	23.930	4024.5	33.864	37.794	4077.0	38.822	43.240	4129.5	43.069	46.918
3972.5	21.471	24.100	4025.0	33.880	37.897	4077.5	38.838	43.283	4130.0	43.083	46.932
3973.0	21.749	24.362	4025.5	34.011	38.001	4					

Table 5-13 $\frac{1}{v} \int_0^v -\ln T(v) dz$

Snn. No.			Snn. No.			Snn. No.			Snn. No.		
35			36			35			36		
p(atm)			p(atm)			p(atm)			p(atm)		
$\times 10^{-1}$			$\times 10^{-1}$			$\times 10^{-1}$			$\times 10^{-1}$		
P_e (atm)			P_e (atm)			P_e (atm)			P_e (atm)		
$\times 10^0$			$\times 10^0$			$\times 10^0$			$\times 10^0$		
v (gm/cm ²)			v (gm/cm ²)			v (gm/cm ²)			v (gm/cm ²)		
$\times 10^{-2}$			$\times 10^{-2}$			$\times 10^{-2}$			$\times 10^{-2}$		
v^{-1} 3935			v^{-1} 3935			v^{-1} 3935			v^{-1} 3935		
cm ⁻¹			cm ⁻¹			cm ⁻¹			cm ⁻¹		
3935.0	0.	0.	3935.0	2.3292566+003	2.8143661+003	4035.0	2.8643578+003	3.4034478+003	4085.0	3.1209510+003	3.6557267+003
3935.5	2.1109209+001	3.5196405+001	3935.5	2.3354011+003	2.8207644+003	4035.5	2.8660171+003	3.4055020+003	4085.5	3.1233268+003	3.6578976+003
3936.0	3.7341392+001	6.3110975+001	3936.0	2.3405574+003	2.8271944+003	4036.0	2.8676261+003	3.4073606+003	4086.0	3.1263931+003	3.6604141+003
3936.5	5.0646666+001	8.6964751+001	3936.5	2.3450752+003	2.8329761+003	4036.5	2.8692841+003	3.4091499+003	4086.5	3.1296608+003	3.6631490+003
3937.0	6.3063747+001	1.0899654+002	3937.0	2.3486596+003	2.8380593+003	4037.0	2.8709526+003	3.4109931+003	4087.0	3.1327172+003	3.6660776+003
3937.5	7.4687851+001	1.3105747+002	3937.5	2.3517043+003	2.8427863+003	4037.5	2.8726240+003	3.4127039+003	4087.5	3.1360470+003	3.6694067+003
3938.0	9.4772951+001	1.5590691+002	3938.0	2.3546492+003	2.8472888+003	4038.0	2.8743277+003	3.4143915+003	4088.0	3.1395071+003	3.6732453+003
3938.5	1.2479609+002	1.8566707+002	3938.5	2.3574722+003	2.8520419+003	4038.5	2.8751167+003	3.4161127+003	4088.5	3.1430982+003	3.6774934+003
3939.0	1.5051947+002	2.1753029+002	3939.0	2.3614988+003	2.8574299+003	4039.0	2.8761339+003	3.4179096+003	4089.0	3.1536393+003	3.6818377+003
3939.5	1.7201701+002	2.4783763+002	3939.5	2.3685117+003	2.8647805+003	4039.5	2.8784375+003	3.4198153+003	4089.5	3.1562070+003	3.6846470+003
3940.0	1.9022289+002	2.7681750+002	3940.0	2.3805851+003	2.8766851+003	4040.0	2.8801411+003	3.4217994+003	4090.0	3.1579031+003	3.6870363+003
3940.5	2.1091187+002	3.0700316+002	3940.5	2.3969135+003	2.8915631+003	4040.5	2.8819466+003	3.4239076+003	4090.5	3.1593935+003	3.6887218+003
3941.0	2.3468465+002	3.4352898+002	3941.0	2.4161172+003	2.9079036+003	4041.0	2.8837756+003	3.4261477+003	4091.0	3.1607090+003	3.6901667+003
3941.5	2.7124603+002	3.8992929+002	3941.5	2.4286350+003	2.9210798+003	4041.5	2.8855130+003	3.4284284+003	4091.5	3.1619647+003	3.6914753+003
3942.0	3.2627492+002	4.5202098+002	3942.0	2.4356187+003	2.9310770+003	4042.0	2.8871944+003	3.4309712+003	4092.0	3.1632296+003	3.6926726+003
3942.5	4.1064880+002	5.3737159+002	3942.5	2.4421282+003	2.9394964+003	4042.5	2.8901517+003	3.4340748+003	4092.5	3.1644427+003	3.6938132+003
3943.0	5.0310444+002	6.4776513+002	3943.0	2.4496882+003	2.9480854+003	4043.0	2.8937379+003	3.4381167+003	4093.0	3.1656746+003	3.6949604+003
3943.5	5.7681574+002	7.4958227+002	3943.5	2.4553405+003	2.9562377+003	4043.5	2.8979945+003	3.4434865+003	4093.5	3.1670481+003	3.6961512+003
3944.0	6.3625025+002	8.2875267+002	3944.0	2.4616067+003	2.9641119+003	4044.0	2.9023506+003	3.4506420+003	4094.0	3.1684119+003	3.6973657+003
3944.5	6.8259659+002	8.9129967+002	3944.5	2.4722833+003	2.9734511+003	4044.5	2.9221762+003	3.4600104+003	4094.5	3.1696551+003	3.6983169+003
3945.0	7.1225768+002	9.3939022+002	3945.0	2.4899426+003	2.9853873+003	4045.0	2.9391752+003	3.4713940+003	4095.0	3.1708278+003	3.6991872+003
3945.5	7.3203872+002	9.7572561+002	3945.5	2.5050495+003	2.9982412+003	4045.5	2.9538861+003	3.4827125+003	4095.5	3.1718785+003	3.7000700+003
3946.0	7.4984760+002	1.0076114+003	3946.0	2.5136855+003	3.0085811+003	4046.0	2.9673276+003	3.4915546+003	4096.0	3.1729293+003	3.7010278+003
3946.5	7.7226342+002	1.0420134+003	3946.5	2.5184985+003	3.0216095+003	4046.5	2.9653276+003	3.4976548+003	4096.5	3.1739707+003	3.7021889+003
3947.0	8.1497040+002	1.0908890+003	3947.0	2.5222259+003	3.0219650+003	4047.0	2.9680524+003	3.5018829+003	4097.0	3.1750077+003	3.7027819+003
3947.5	8.9147572+002	1.1749072+003	3947.5	2.5252639+003	3.0256223+003	4047.5	2.9702309+003	3.5050659+003	4097.5	3.1761105+003	3.7036310+003
3948.0	9.7431114+002	1.2785887+003	3948.0	2.5276675+003	3.0308951+003	4048.0	2.9721138+003	3.5078034+003	4098.0	3.1771709+003	3.7047414+003
3948.5	1.0382047+003	1.3656338+003	3948.5	2.5299951+003	3.0373403+003	4048.5	2.9737249+003	3.5100835+003	4098.5	3.1782431+003	3.7052748+003
3949.0	1.0863748+003	1.4399090+003	3949.0	2.5324986+003	3.0438211+003	4049.0	2.9752578+003	3.5120866+003	4099.0	3.1792530+003	3.7061359+003
3949.5	1.1479452+003	1.4989125+003	3949.5	2.5346477+003	3.0417632+003	4049.5	2.9767104+003	3.5139857+003	4099.5	3.1802952+003	3.7068990+003
3950.0	1.2285490+003	1.5663332+003	4000.0	2.5366846+003	3.0450425+003	4050.0	2.9780662+003	3.5157614+003	4100.0	3.1814310+003	3.7075120+003
3950.5	1.2990512+003	1.6334203+003	4000.5	2.5390200+003	3.0488122+003	4050.5	2.9795709+003	3.5175768+003	4100.5	3.1825557+003	3.7084960+003
3951.0	1.3423200+003	1.6873853+003	4001.0	2.5416230+003	3.0518598+003	4051.0	2.9811714+003	3.5194207+003	4101.0	3.1836964+003	3.7091275+003
3951.5	1.3681699+003	1.7264690+003	4001.5	2.5446373+003	3.0554681+003	4051.5	2.9828183+003	3.5212651+003	4101.5	3.1848204+003	3.7101396+003
3952.0	1.3860837+003	1.7565711+003	4002.0	2.5466732+003	3.0589013+003	4052.0	2.9845706+003	3.5232406+003	4102.0	3.1859576+003	3.7112198+003
3952.5	1.4102564+003	1.7813501+003	4002.5	2.5494953+003	3.0623226+003	4052.5	2.9864445+003	3.5253437+003	4102.5	3.1870463+003	3.7124667+003
3953.0	1.4393751+003	1.8089931+003	4003.0	2.5535425+003	3.0671331+003	4053.0	2.9884991+003	3.5276229+003	4103.0	3.1880943+003	3.7131040+003
3953.5	1.4680475+003	1.8367276+003	4003.5	2.5575677+003	3.0723410+003	4053.5	2.9913221+003	3.5295470+003	4103.5	3.1891780+003	3.7137277+003
3954.0	1.4864050+003	1.8595921+003	4004.0	2.5604390+003	3.0770418+003	4054.0	2.9926795+003	3.5312720+003	4104.0	3.1903311+003	3.7141809+003
3954.5	1.4995644+003	1.8798761+003	4004.5	2.5629255+003	3.0808275+003	4054.5	2.9939735+003	3.5328805+003	4104.5	3.1915912+003	3.7146649+003
3955.0	1.5117765+003	1.8962474+003	4005.0	2.5659857+003	3.0846177+003	4055.0	2.9952622+003	3.5346517+003	4105.0	3.1928429+003	3.7152540+003
3955.5	1.5259362+003	1.9131760+003	4005.5	2.5694742+003	3.0889183+003	4055.5	2.9965676+003	3.5359801+003	4105.5	3.1940979+003	3.7157784+003
3956.0	1.5396207+003	1.9309711+003	4006.0	2.5732951+003	3.0938184+003	4056.0	2.9977771+003	3.5373547+003	4106.0	3.1953489+003	3.7163593+003
3956.5	1.5509120+003	1.9505491+003	4006.5	2.5765466+003	3.0989685+003	4056.5	2.9989491+003	3.5386910+003	4106.5	3.1965962+003	3.7169040+003
3957.0	1.5658467+003	1.9716643+003	4007.0	2.5812698+003	3.1043619+003	4057.0	3.0002525+003	3.5400611+003	4107.0	3.1978394+003	3.7174444+003
3957.5	1.6069378+003	1.9970391+003	4007.5	2.5868910+003	3.1114480+003	4057.5	3.0016442+003	3.5423657+003	4107.5	3.1990801+003	3.7179806+003
3958.0	1.6258038+003	2.0129550+003	4008.0	2.6007335+003	3.1209176+003	4058.0	3.0030916+003	3.5445153+003	4108.0	3.2003239+003	3.7185257+003
3958.5	1.6427499+003	2.0377081+003	4008.5	2.6116880+003	3.1310272+003	4058.5	3.0045159+003	3.5466128+003	4108.5	3.2015747+003	3.7190700+003
3959.0	1.6556440+003	2.0554955+003	4009.0	2.6207009+003	3.1466154+003	4059.0	3.0060834+003	3.5482494+003	4109.0	3.2028247+003	3.7196144+003
3959.5	1.6717388+003	2.0719981+003	4009.5	2.6266579+003	3.1577929+003	4059.5	3.0080293+003	3.5507689+003	4109.5	3.2040726+003	3.7201588+003
3960.0	1.6862065+003	2.0890180+003	4010.0	2.6319796+003	3.1662980+003	4060.0	3.0113151+003	3.5539362+003	4110.0	3.2053180+003	3.7206915+003
3960.5	1.6971480+003	2.1050441+003	4010.5	2.6365168+003	3.1						

SECTION 6

SAMPLES WITH LARGE ABSORBER THICKNESS AND LOW PRESSURE

6.1 DISCUSSION

The spectra discussed in this section were selected to show the maximum structure and to provide data from which half-widths of many of the lines can be determined. After the line strengths have been determined, the half-widths can be found from the integrated absorptance by the use of the well-known Ladenberg and Reiche¹⁶ function which has been tabulated by Kaplan and Eggers.¹⁷

The samples were chosen with P_e sufficiently low that the integrated absorptance of the stronger lines was highly pressure dependent, yet high enough that Doppler broadening could be neglected. Of course, the half-widths must be determined from samples in which the integrated absorptance is dependent on pressure. Approximate values of the strengths of some of the weaker lines can be found from the results of Samples 39 and 41, whose equivalent pressures are approximately 1 atm. The sample parameters are listed in Table 6-1.

Several H_2O and HDO lines which can be seen below 2900 cm^{-1} in the spectra of Samples 40 and 41 have not been observed in solar spectra because of overlapping CH_4 lines. The most important HDO lines have been observed and identified by Benedict, Gailar and Plyler;⁷ and some which are not hidden in solar spectra have been identified by Migeotte et al.⁶

Several of the lines used for calibration are indicated in the spectra of Samples 37, 38 and 40. Every tenth line has been numbered, and lines whose numbers end in 5 have been indicated with an "x." Wavenumbers of these lines are given in Table 2-2.

The results for $\nu < 3000 \text{ cm}^{-1}$ are considerably less accurate than those for higher wavenumbers because of the uncertainty in placing the zero absorptance (background) curves on the spectra. In this region the recorder deflection was low and there were no tie-points nearby. Furthermore, there was some unexplained variation in zero-absorptance curves from one day to another. We did not determine the cause of this unusual variation, but it may have been a varying film of oil or other substance on some of the optical components. In order to reduce the spectra, an estimated zero absorptance curve was obtained by joining several of the absorptance minima of Sample 40 by a smooth curve. A curve having the same shape was then drawn on the spectrum of Sample 41 with the height adjusted to give a "reasonable" absorptance near the absorptance minima.

6.2 RESULTS

TABLE 6-1
SAMPLE PARAMETERS

Sam. No.	p torr	P torr	P _e [*] torr	p atm	P atm	P _e atm	L Path m	u gm/cm ²
37	5.6	230	252	0.00737	0.303	0.332	32.9	0.0180
38	4.15	134	151	0.00546	0.176	0.199	4.16	0.00169
39	7.35	723	752	0.00967	0.951	0.989	121	0.0867
40	15.3	152	213	0.0201	0.200	0.280	933	1.39
41	15.2	681	742	0.0200	0.896	0.976	933	1.38

Sam. No.	Spectral Region to which Transmittance and Integral Tables Are Shown		
	Table 6-2, 6-3 cm ⁻¹	Table 6-4, 6-5 cm ⁻¹	Table 6-6, 6-7 cm ⁻¹
37	2938-3464		
38		3464-3810	3810-4049
39	2929-3464	3464-3810	3810-4258
40	2808-3464		3810-4365
41	2808-3460		3810-4365

*P_e = P + 4p in accordance with Equation (3-8) and the results in Section 3. All samples were at room temperature, 296°K.

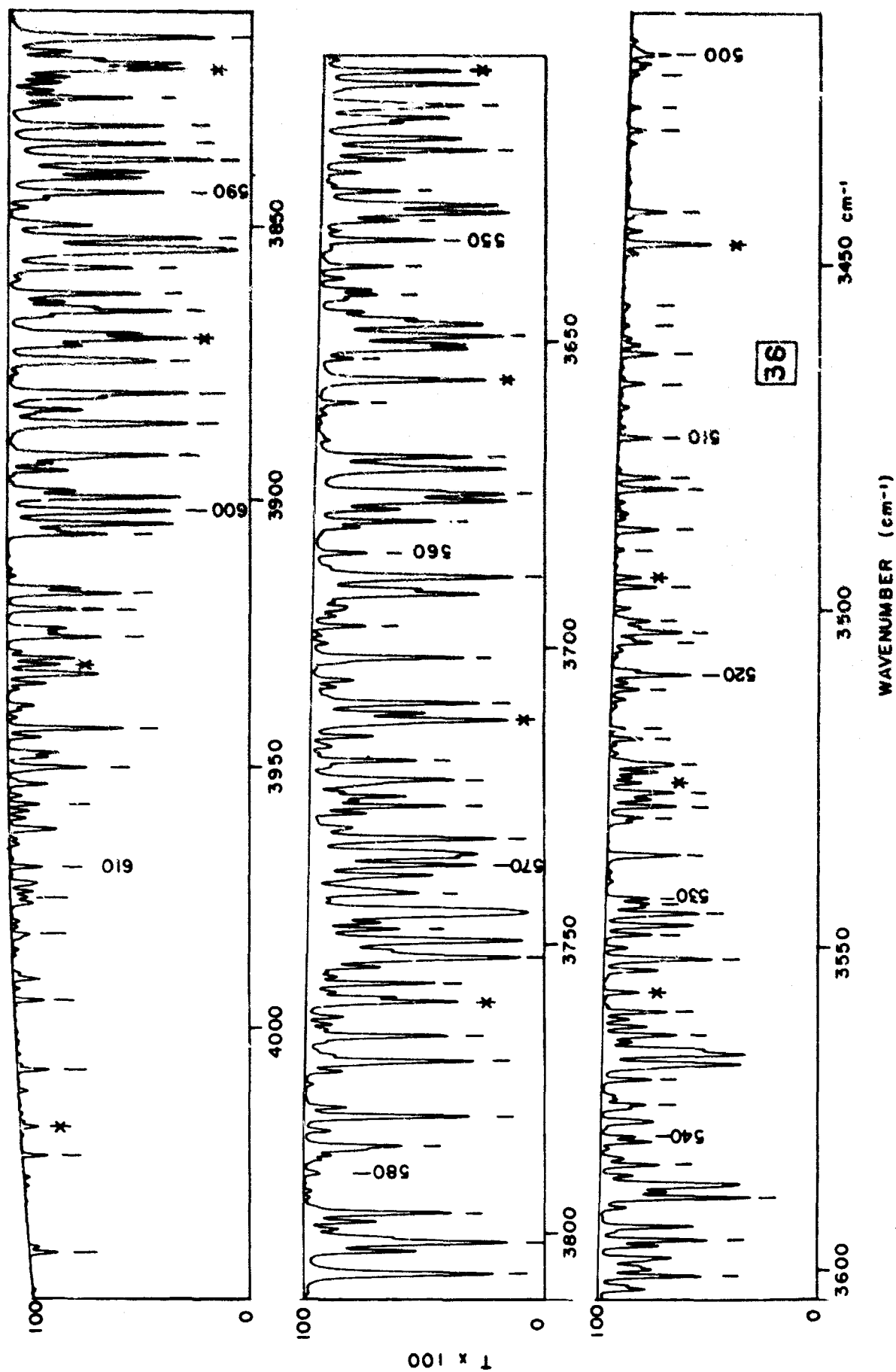


Fig. 6-2

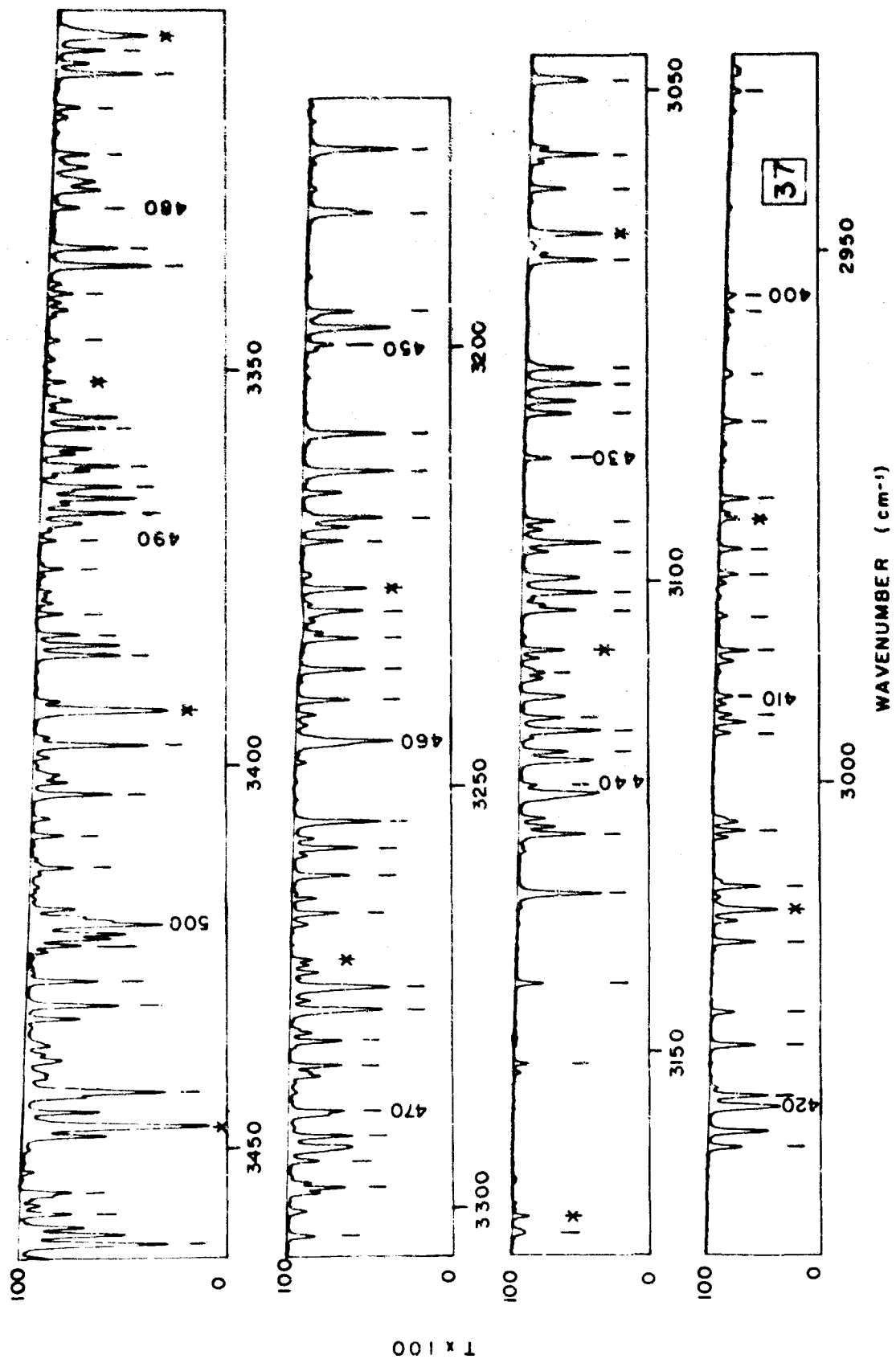


Fig. 6-1

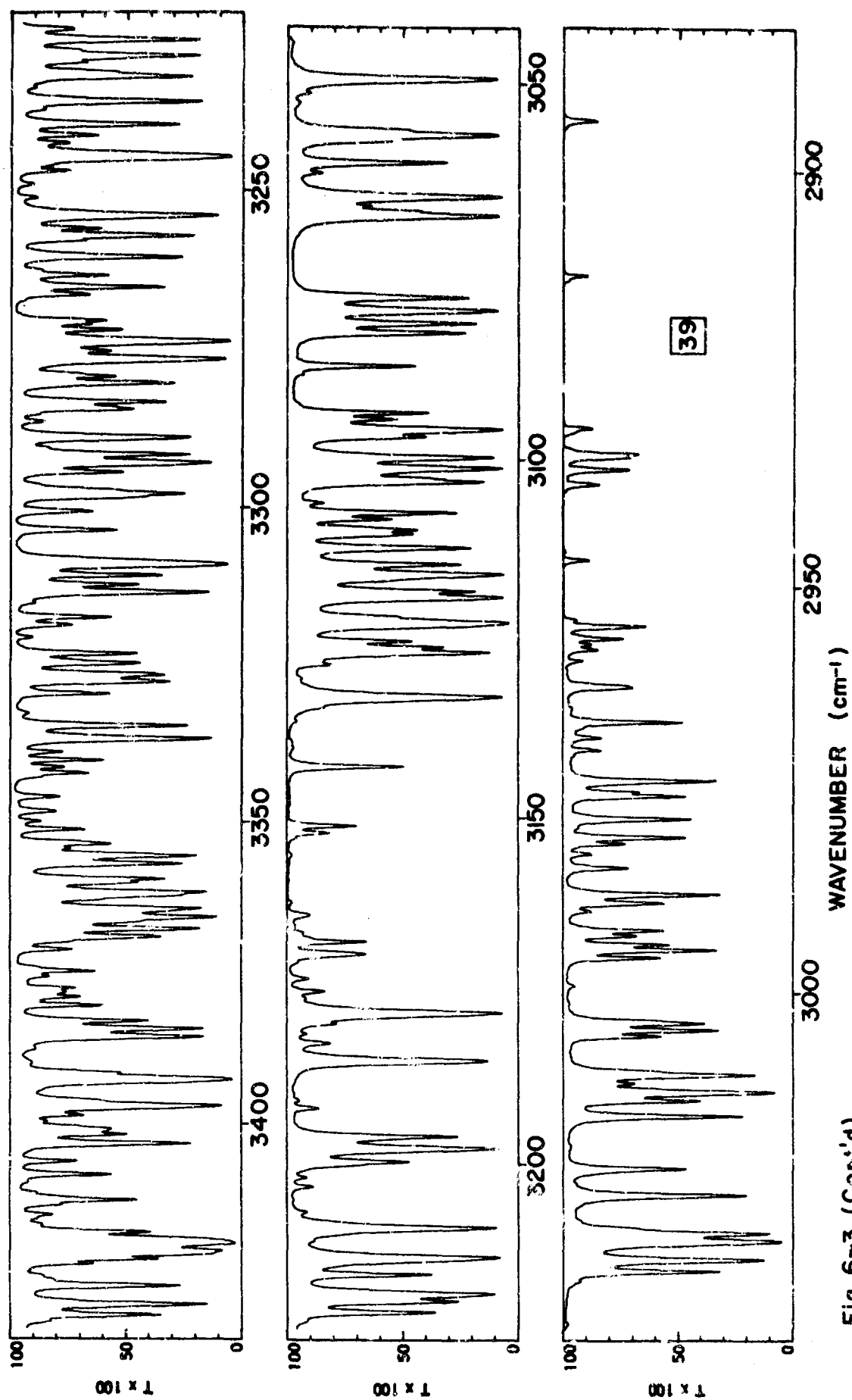


Fig. 6-3 (Cont'd)

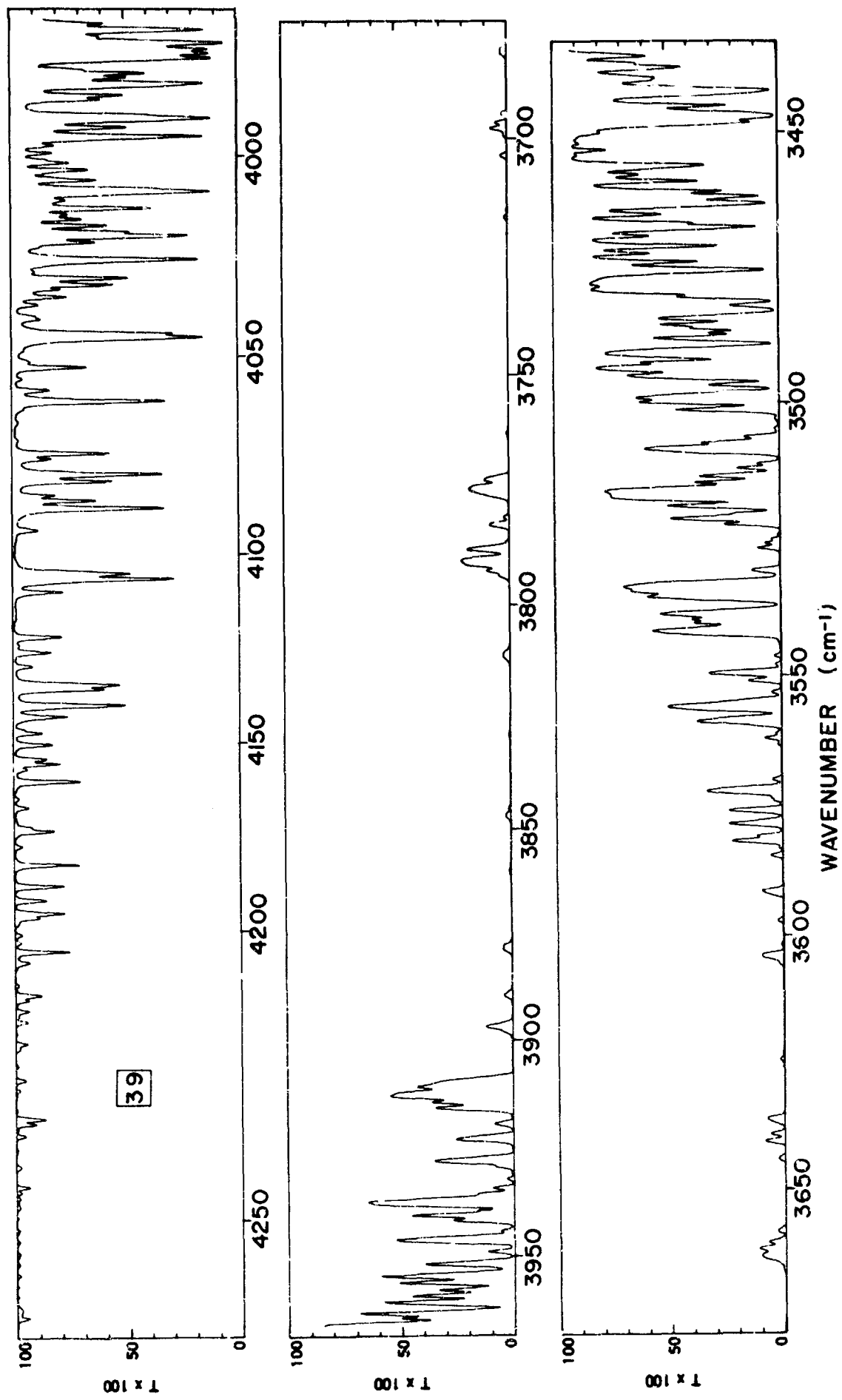


Fig. 6-3

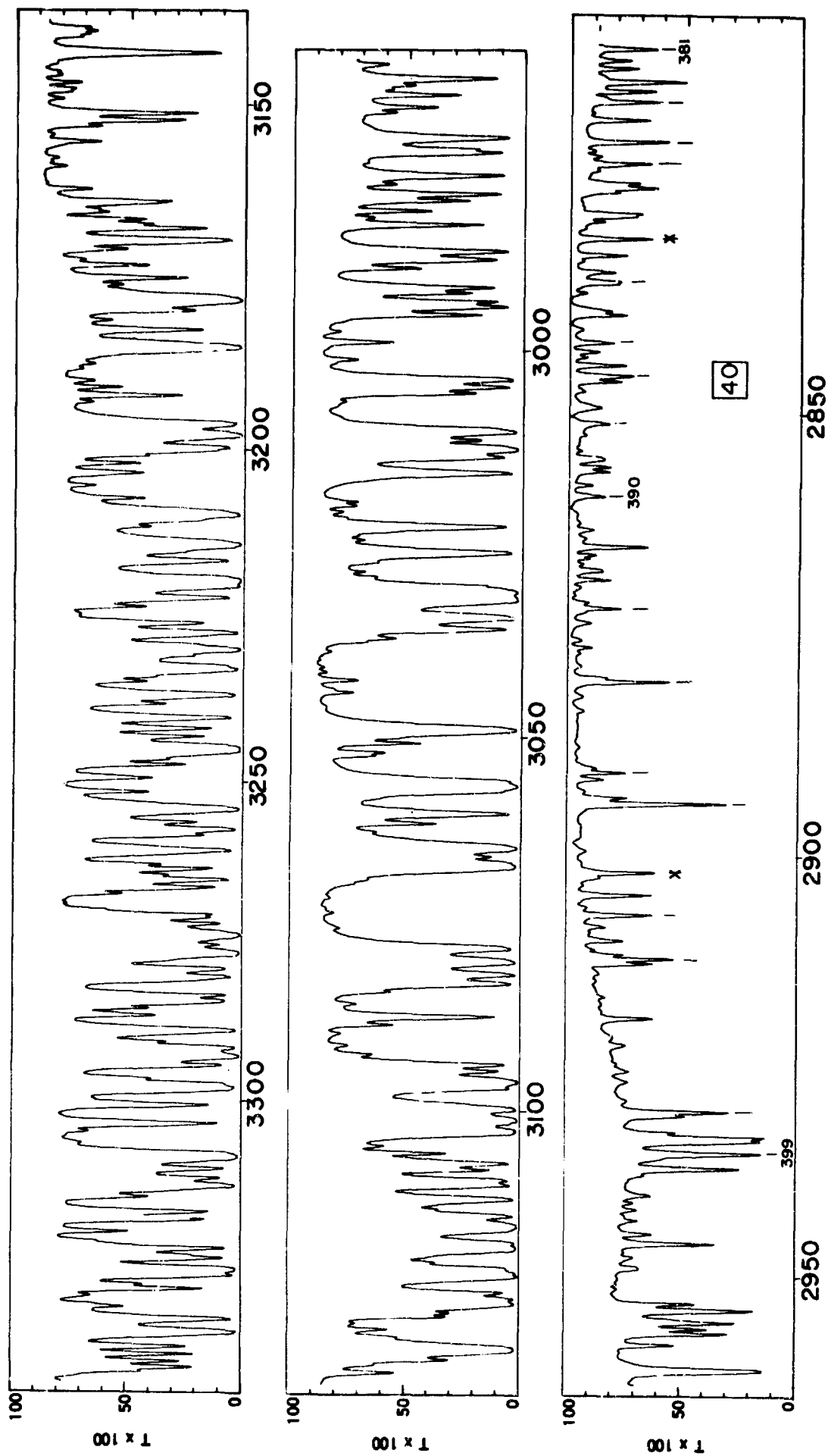
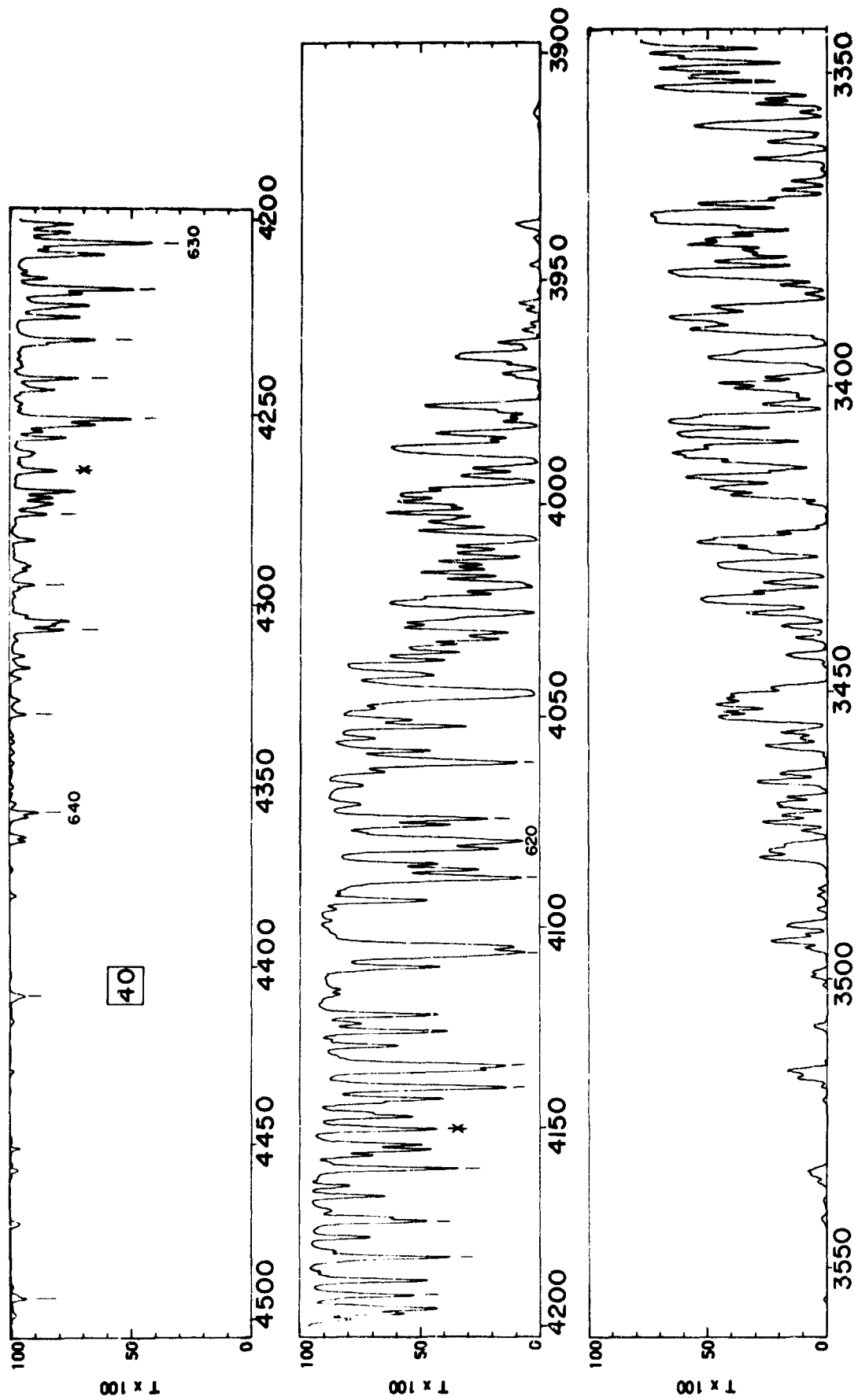


Fig. 6-4 (Cont'd)

WAVENUMBER (cm^{-1})



WAVENUMBER (cm⁻¹)

Fig. 6-4

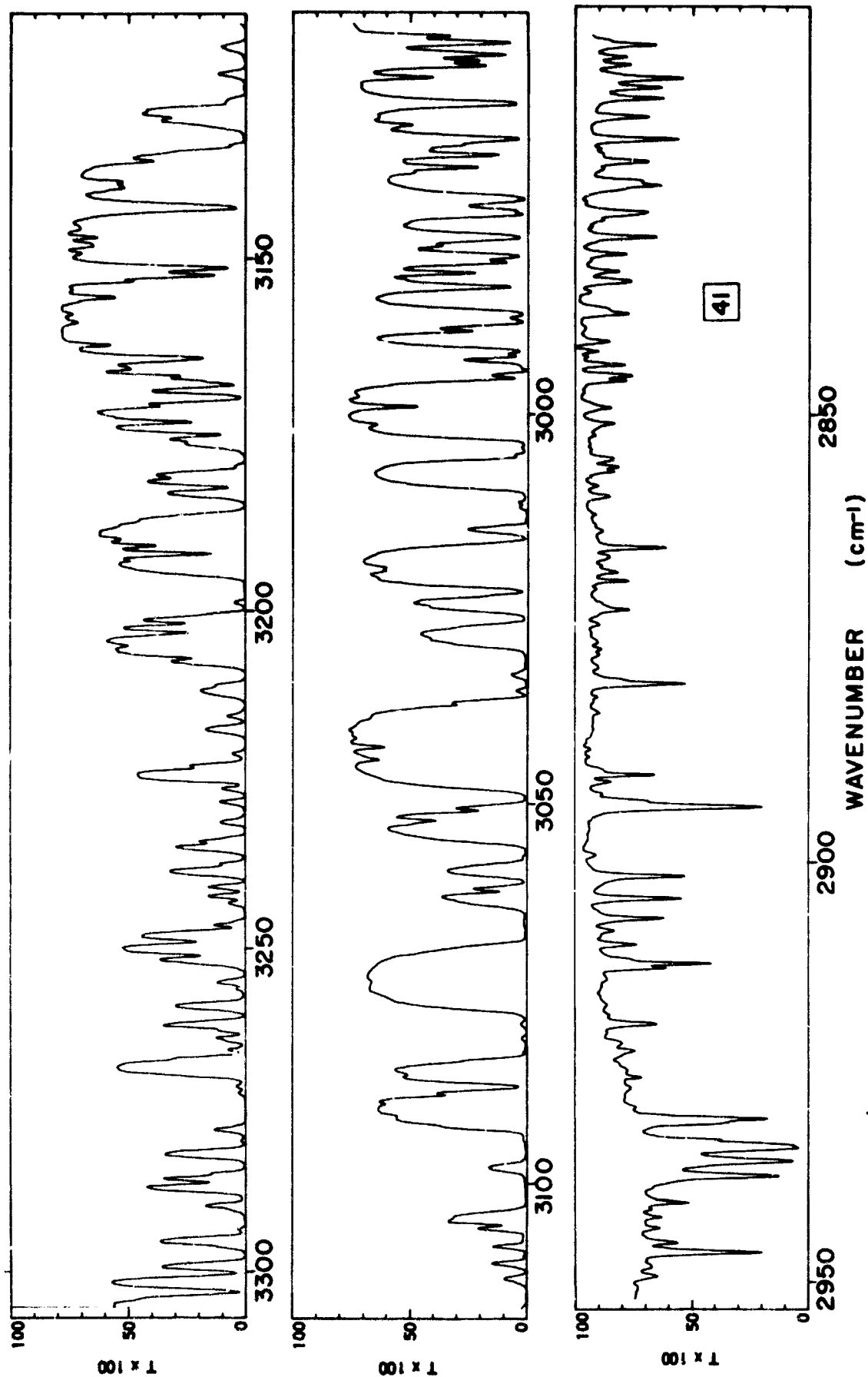


Fig. 6-5 (Cont'd)

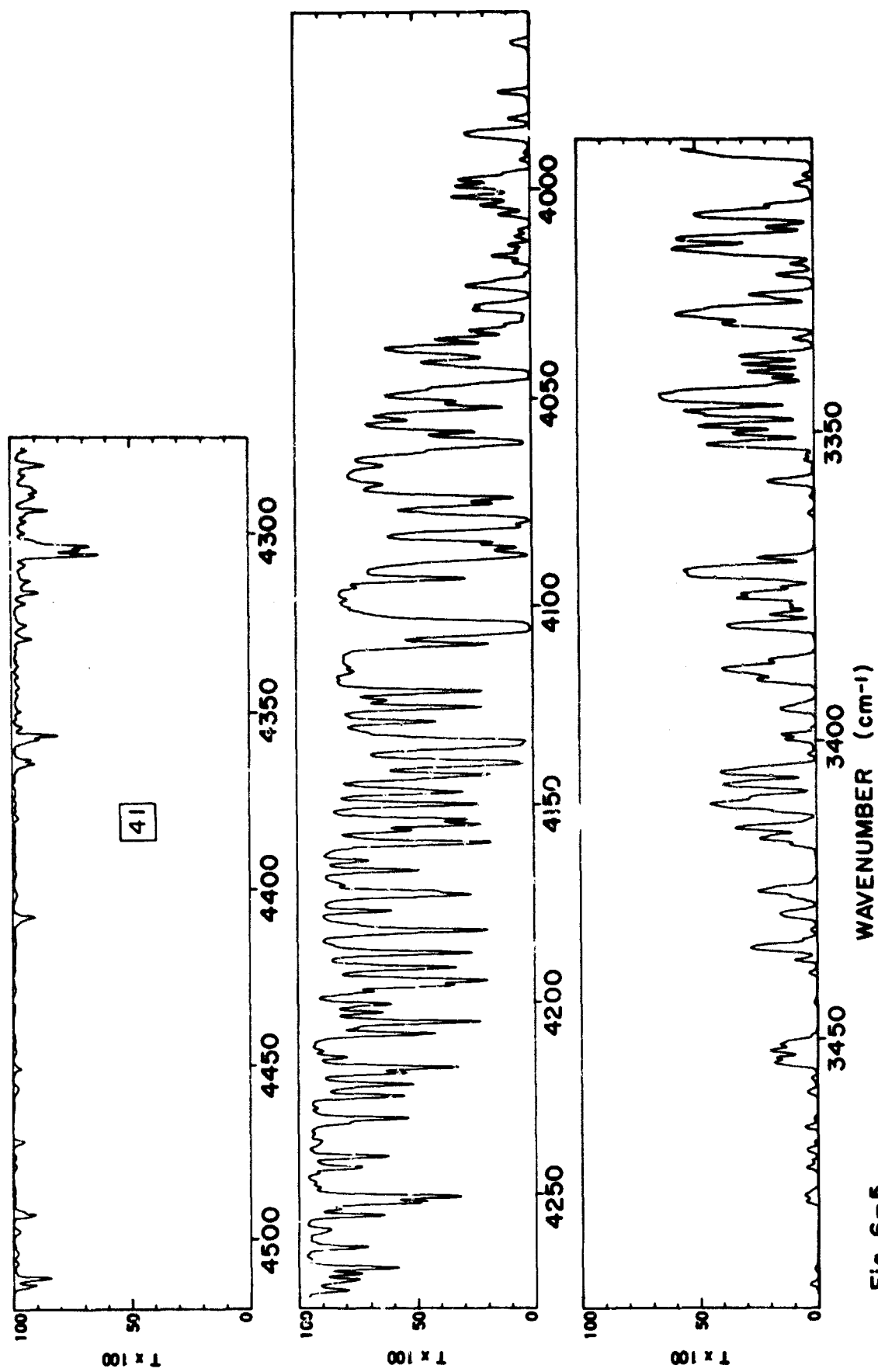


Fig. 6-5

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
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Table 6-2

[illegible]

Table 6-2 (Cont'd)

[illegible]

[illegible]

[illegible]

Table 6-2 (Cont'd)

No.	Input				Output				Intermediate				Final			
	Year	Month	Day	Time	Year	Month	Day	Time	Year	Month	Day	Time	Year	Month	Day	Time
1	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
2	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
3	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
4	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
5	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
6	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
7	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
8	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
9	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
10	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
11	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
12	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
13	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
14	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
15	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
16	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
17	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
18	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
19	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
20	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
21	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
22	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
23	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00
24	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00	1990	01	01	00:00

Table 6-2 (Cont'd)

[illegible]

Table 6-2 (Cont'd)

[illegible]

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Table 6-2 (Cont'd)

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2	00200	00201	00202	00203	00204	00205	00206	00207	00208	00209	00210	00211	00212	00213	00214	00215	00216	00217	00218	00219	00220	00221	00222	00223	00224	00225	00226	00227	00228	00229	00230	00231	00232	00233	00234	00235	00236	00237	00238	00239	00240	00241	00242	00243	00244	00245	00246	00247	00248	00249	00250	00251	00252	00253	00254	00255	00256	00257	00258	00259	00260	00261	00262	00263	00264	00265	00266	00267	00268	00269	00270	00271	00272	00273	00274	00275	00276	00277	00278	00279	00280	00281	00282	00283	00284	00285	00286	00287	00288	00289	00290	00291	00292	00293	00294	00295	00296	00297	00298	00299
3	00300	00301	00302	00303	00304	00305	00306	00307	00308	00309	00310	00311	00312	00313	00314	00315	00316	00317	00318	00319	00320	00321	00322	00323	00324	00325	00326	00327	00328	00329	00330	00331	00332	00333	00334	00335	00336	00337	00338	00339	00340	00341	00342	00343	00344	00345	00346	00347	00348	00349	00350	00351	00352	00353	00354	00355	00356	00357	00358	00359	00360	00361	00362	00363	00364	00365	00366	00367	00368	00369	00370	00371	00372	00373	00374	00375	00376	00377	00378	00379	00380	00381	00382	00383	00384	00385	00386	00387	00388	00389	00390	00391	00392	00393	00394	00395	00396	00397	00398	00399
4	00400	00401	00402	00403	00404	00405	00406	00407	00408	00409	00410	00411	00412	00413	00414	00415	00416	00417	00418	00419	00420	00421	00422	00423	00424	00425	00426	00427	00428	00429	00430	00431	00432	00433	00434	00435	00436	00437	00438	00439	00440	00441	00442	00443	00444	00445	00446	00447	00448	00449	00450	00451	00452	00453	00454	00455	00456	00457	00458	00459	00460	00461	00462	00463	00464	00465	00466	00467	00468	00469	00470	00471	00472	00473	00474	00475	00476	00477	00478	00479	00480	00481	00482	00483	00484	00485	00486	00487	00488	00489	00490	00491	00492	00493	00494	00495	00496	00497	00498	00499
5	00500	00501	00502	00503	00504	00505	00506	00507	00508	00509	00510	00511	00512	00513	00514	00515	00516	00517	00518	00519	00520	00521	00522	00523	00524	00525	00526	00527	00528	00529	00530	00531	00532	00533	00534	00535	00536	00537	00538	00539	00540	00541	00542	00543	00544	00545	00546	00547	00548	00549	00550	00551	00552	00553	00554	00555	00556	00557	00558	00559	00560	00561	00562	00563	00564	00565	00566	00567	00568	00569	00570	00571	00572	00573	00574	00575	00576	00577	00578	00579	00580	00581	00582	00583	00584	00585	00586	00587	00588	00589	00590	00591	00592	00593	00594	00595	00596	00597	00598	00599
6	00600	00601	00602	00603	00604	00605	00606	00607	00608	00609	00610	00611	00612	00613	00614	00615	00616	00617	00618	00619	00620	00621	00622	00623	00624	00625	00626	00627	00628	00629	00630	00631	00632	00633	00634	00635	00636	00637	00638	00639	00640	00641	00642	00643	00644	00645	00646	00647	00648	00649	00650	00651	00652	00653	00654	00655	00656	00657	00658	00659	00660	00661	00662	00663	00664	00665	00666	00667	00668	00669	00670	00671	00672	00673	00674	00675	00676	00677	00678	00679	00680	00681	00682	00683	00684	00685	00686	00687	00688	00689	00690	00691	00692	00693	00694	00695	00696	00697	00698	00699
7	00700	00701	00702	00703	00704	00705	00706	00707	00708	00709	00710	00711	00712	00713	00714	00715	00716	00717	00718	00719	00720	00721	00722	00723	00724	00725	00726	00727	00728	00729	00730	00731	00732	00733	00734	00735	00736	00737	00738	00739	00740	00741	00742	00743	00744	00745	00746	00747	00748	00749	00750	00751	00752	00753	00754	00755	00756	00757	00758	00759	00760	00761	00762	00763	00764	00765	00766	00767	00768	00769	00770	00771	00772	00773	00774	00775	00776	00777	00778	00779	00780	00781	00782	00783	00784	00785	00786	00787	00788	00789	00790	00791	00792	00793	00794	00795	00796	00797	00798	00799
8	00800	00801	00802	00803	00804	00805	00806	00807	00808	00809	00810	00811	00812	00813	00814	00815	00816	00817	00818	00819	00820	00821	00822	00823	00824	00825	00826	00827	00828	00829	00830	00831	00832	00833	00834	00835	00836	00837	00838	00839	00840	00841	00842	00843	00844	00845	00846	00847	00848	00849	00850	00851	00852	00853	00854	00855	00856	00857	00858	00859	00860	00861	00862	00863	00864	00865	00866	00867	00868	00869	00870	00871	00872	00873	00874	00875	00876	00877	00878	00879	00880	00881	00882	00883	00884	00885	00886	00887	00888	00889	00890	00891	00892	00893	00894	00895	00896	00897	00898	00899
9	00900	00901	00902	00903	00904	00905	00906	00907	00908	00909	00910	00911	00912	00913	00914	00915	00916	00917	00918	00919	00920	00921	00922	00923	00924	00925	00926	00927	00928	00929	00930	00931	00932	00933	00934	00935	00936	00937	00938	00939	00940	00941	00942	00943	00944	00945	00946	00947	00948	00949	00950	00951	00952	00953	00954	00955	00956	00957	00958	00959	00960	00961	00962	00963	00964	00965	00966	00967	00968	00969	00970	00971	00972	00973	00974	00975	00976	00977	00978	00979	00980	00981	00982	00983	00984	00985	00986	00987	00988	00989	00990	00991	00992	00993	00994	00995	00996	00997	00998	00999

Table 6-3 $\int A'(v) dv$

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100

Table 6-3 $\int_1^{\infty} \dot{A}(v) dv$ (cont'd)[illegible]

Table 6-4

[illegible]

Table 6-4 (Cont'd)

[illegible]

Table 6-4 (Cont'd)

[illegible]

[illegible]

Table 6-5 $\int_4^2 A(v) dv$

Table 6-5 $\int A(z) dz$ (cont'd)

[illegible]

Table 6-6

[illegible]

Table 6-6 (Cont'd)

[illegible]

4191.0	2-18255	4234.0	2-18189	4271.0	2-18137	4308.0	2-18081	4345.0	2-18025	4382.0	2-17969	4419.0	2-17913	4456.0	2-17857	4493.0	2-17801	4530.0	2-17745	4567.0	2-17689	4604.0	2-17633	4641.0	2-17577	4678.0	2-17521	4715.0	2-17465	4752.0	2-17409	4789.0	2-17353	4826.0	2-17297	4863.0	2-17241	4900.0	2-17185	4937.0	2-17129	4974.0	2-17073	5011.0	2-17017	5048.0	2-16961	5085.0	2-16905	5122.0	2-16849	5159.0	2-16793	5196.0	2-16737	5233.0	2-16681	5270.0	2-16625	5307.0	2-16569	5344.0	2-16513	5381.0	2-16457	5418.0	2-16401	5455.0	2-16345	5492.0	2-16289	5529.0	2-16233	5566.0	2-16177	5603.0	2-16121	5640.0	2-16065	5677.0	2-16009	5714.0	2-15953	5751.0	2-15897	5788.0	2-15841	5825.0	2-15785	5862.0	2-15729	5899.0	2-15673	5936.0	2-15617	5973.0	2-15561	6010.0	2-15505	6047.0	2-15449	6084.0	2-15393	6121.0	2-15337	6158.0	2-15281	6195.0	2-15225	6232.0	2-15169	6269.0	2-15113	6306.0	2-15057	6343.0	2-15001	6380.0	2-14945	6417.0	2-14889	6454.0	2-14833	6491.0	2-14777	6528.0	2-14721	6565.0	2-14665	6602.0	2-14609	6639.0	2-14553	6676.0	2-14497	6713.0	2-14441	6750.0	2-14385	6787.0	2-14329	6824.0	2-14273	6861.0	2-14217	6898.0	2-14161	6935.0	2-14105	6972.0	2-14049	7009.0	2-14000	7046.0	2-13944	7083.0	2-13888	7120.0	2-13832	7157.0	2-13776	7194.0	2-13720	7231.0	2-13664	7268.0	2-13608	7305.0	2-13552	7342.0	2-13496	7379.0	2-13440	7416.0	2-13384	7453.0	2-13328	7490.0	2-13272	7527.0	2-13216	7564.0	2-13160	7601.0	2-13104	7638.0	2-13048	7675.0	2-13000	7712.0	2-12944	7749.0	2-12888	7786.0	2-12832	7823.0	2-12776	7860.0	2-12720	7897.0	2-12664	7934.0	2-12608	7971.0	2-12552	8008.0	2-12496	8045.0	2-12440	8082.0	2-12384	8119.0	2-12328	8156.0	2-12272	8193.0	2-12216	8230.0	2-12160	8267.0	2-12104	8304.0	2-12048	8341.0	2-11992	8378.0	2-11936	8415.0	2-11880	8452.0	2-11824	8489.0	2-11768	8526.0	2-11712	8563.0	2-11656	8600.0	2-11600	8637.0	2-11544	8674.0	2-11488	8711.0	2-11432	8748.0	2-11376	8785.0	2-11320	8822.0	2-11264	8859.0	2-11208	8896.0	2-11152	8933.0	2-11096	8970.0	2-11040	9007.0	2-10984	9044.0	2-10928	9081.0	2-10872	9118.0	2-10816	9155.0	2-10760	9192.0	2-10704	9229.0	2-10648	9266.0	2-10592	9303.0	2-10536	9340.0	2-10480	9377.0	2-10424	9414.0	2-10368	9451.0	2-10312	9488.0	2-10256	9525.0	2-10200	9562.0	2-10144	9600.0	2-10088	9637.0	2-10032	9670.0	2-9964	9707.0	2-9908	9745.0	2-9892	9780.0	2-9836	9872.0	2-9760	9909.0	2-9704	9946.0	2-9648	9983.0	2-9592	10020.0	2-9536	10057.0	2-9480	10094.0	2-9424	10131.0	2-9368	10168.0	2-9312	10205.0	2-9256	10242.0	2-9200	10279.0	2-9144	10316.0	2-9088	10353.0	2-9032	10390.0	2-8976	10427.0	2-8920	10464.0	2-8864	10501.0	2-8808	10538.0	2-8752	10575.0	2-8696	10612.0	2-8640	10649.0	2-8584	10686.0	2-8528	10723.0	2-8472	10760.0	2-8416	10797.0	2-8360	10834.0	2-8308	10871.0	2-8252	10908.0	2-8196	10945.0	2-8140	10982.0	2-8084	11019.0	2-8028	11056.0	2-7972	11093.0	2-7916	11130.0	2-7860	11167.0	2-7804	11204.0	2-7748	11241.0	2-7692	11278.0	2-7636	11315.0	2-7580	11352.0	2-7524	11389.0	2-7468	11426.0	2-7412	11463.0	2-7356	11500.0	2-7300	11537.0	2-7244	11574.0	2-7188	11611.0	2-7132	11648.0	2-7076	11685.0	2-7020	11722.0	2-6964	11759.0	2-6908	11796.0	2-6852	11833.0	2-6796	11870.0	2-6740	11907.0	2-6684	11944.0	2-6628	11981.0	2-6572	12018.0	2-6516	12055.0	2-6460	12092.0	2-6404	12129.0	2-6348	12166.0	2-6292	12203.0	2-6236	12240.0	2-6180	12277.0	2-6124	12314.0	2-6068	12351.0	2-6012	12388.0	2-5956	12425.0	2-5900	12462.0	2-5844	12499.0	2-5788	12536.0	2-5732	12573.0	2-5676	12610.0	2-5620	12647.0	2-5564	12684.0	2-5508	12721.0	2-5452	12758.0	2-5396	12795.0	2-5340	12832.0	2-5284	12869.0	2-5228	12906.0	2-5172	12943.0	2-5116	12980.0	2-5060	13017.0	2-5004	13054.0	2-4948	13091.0	2-4892	13128.0	2-4836	13165.0	2-4780	13202.0	2-4724	13239.0	2-4668	13276.0	2-4612	13313.0	2-4556	13350.0	2-4500	13387.0	2-4444	13424.0	2-4388	13461.0	2-4332	13498.0	2-4276	13535.0	2-4220	13572.0	2-4164	13609.0	2-4108	13646.0	2-4052	13683.0	2-3996	13720.0	2-3940	13757.0	2-3884	13794.0	2-3828	13831.0	2-3772	13868.0	2-3716	13905.0	2-3660	13942.0	2-3596	13979.0	2-3540	14016.0	2-3484	14053.0	2-3428	14090.0	2-3372	14127.0	2-3316	14164.0	2-3260	14201.0	2-3204	14238.0	2-3148	14275.0	2-3092	14312.0	2-3036	14349.0	2-2980	14386.0	2-2924	14423.0	2-2868	14460.0	2-2812	14497.0	2-2756	14534.0	2-2700	14571.0	2-2644	14608.0	2-2588	14645.0	2-2532	14682.0	2-2476	14719.0	2-2420	14756.0	2-2364	14793.0	2-2308	14830.0	2-2252	14867.0	2-2196	14904.0	2-2140	14941.0	2-2084	14978.0	2-2028	15015.0	2-1972	15052.0	2-1916	15089.0	2-1860	15126.0	2-1804	15163.0	2-1748	15200.0	2-1692	15237.0	2-1636	15274.0	2-1580	15311.0	2-1524	15348.0	2-1468	15385.0	2-1412	15422.0	2-1356	15459.0	2-1300	15496.0	2-1244	15533.0	2-1188	15570.0	2-1132	15607.0	2-1076	15644.0	2-1020	15681.0	2-964	15718.0	2-908	15755.0	2-852	15792.0	2-796	15829.0	2-740	15866.0	2-684	15903.0	2-628	15940.0	2-572	15977.0	2-516	16014.0	2-460	16051.0	2-404	16088.0	2-348	16125.0	2-292	16162.0	2-236	16199.0	2-180	16236.0	2-124	16273.0	2-68	16310.0	2-12	16347.0	2-44	16384.0	2-8	16421.0	2-48	16458.0	2-12	16495.0	2-44	16532.0	2-8	16569.0	2-48	16606.0	2-12	16643.0	2-48	16680.0	2-12	16717.0	2-48	16754.0	2-12	16791.0	2-48	16828.0	2-12	16865.0	2-48	16902.0	2-12	16939.0	2-48	16976.0	2-12	17013.0	2-48	17050.0	2-12	17087.0	2-48	17124.0	2-12	17161.0	2-48	17198.0	2-12	17235.0	2-48	17272.0	2-12	17309.0	2-48	17346.0	2-12	17383.0	2-48	17420.0	2-12	17457.0	2-48	17494.0	2-12	17531.0	2-48	17568.0	2-12	17605.0	2-48	17642.0	2-12	17679.0	2-48	17716.0	2-12	17753.0	2-48	17790.0	2-12	17827.0	2-48	17864.0	2-12	17901.0	2-48	17938.0	2-12	17975.0	2-48	18012.0	2-12	18049.0	2-48	18086.0	2-12	18123.0	2-48	18160.0	2-12	18197.0	2-48	18234.0	2-12	18271.0	2-48	18308.0	2-12	18345.0	2-48	18382.0	2-12	18419.0	2-48	18456.0	2-12	18493.0	2-48	18530.0	2-12	18567.0	2-48	18604.0	2-12	18641.0	2-48	18678.0	2-12	18715.0	2-48	18752.0	2-12	18789.0	2-48	18826.0	2-12	18863.0	2-48	18900.0	2-12	18937.0	2-48	18974.0	2-12	19011.0	2-48	19048.0	2-12	19085.0	2-48	19122.0	2-12	19159.0	2-48	19196.0	2-12	19233.0	2-48	19270.0	2-12	19307.0	2-48	19344.0	2-12	19381.0	2-48	19418.0	2-12	19455.0	2-48	19492.0	2-12	19529.0	2-48	19566.0	2-12	19603.0	2-48	19640.0	2-12	19677.0	2-48	19714.0	2-12	19751.0	2-48	19788.0	2-12	19825.0	2-48	19862.0	2-12	19899.0	2-48	19936.0	2-12	19973.0	2-48	20010.0	2-12	20047.0	2-48	20084.0	2-12	20121.0	2-48	20158.0	2-12	20195.0	2-48	20232.0	2-12	20269.0	2-48	20306.0	2-12	20343.0	2-48	20380.0	2-12	20417.0	2-48	20454.0	2-12	20491.0	2-48	20528.0	2-12	20565.0	2-48	20602.0	2-12	20639.0	2-48	20676.0	2-12	20713.0	2-48	20750.0	2-12	20787.0	2-48	20824.0	2-12	20861.0	2-48	20898.0	2-12	20935.0	2-48	20972.0	2-12	21009.0	2-48	21046.0	2-12	21083.0	2-48	21120.0	2-12	21157.0	2-48	21194.0	2-12	21231.0	2-48	21268.0	2-12	21305.0	2-48	21342.0	2-12	21379.0	2-48	21416.0	2-12	21453.0	2-48	21490.0	2-12	21527.0	2-48	21564.0	2-12	21601.0	2-48	21638.0	2-12	21675.0	2-48	21712.0	2-12	21749.0	2-48	21786.0	2-12	21823.0	2-48	21860.0	2-12	21897.0	2-48	21934.0	2-12	21971.0	2-48	22008.0	2-12	22045.0	2-48	22082.0	2-12	22119.0	2-48	22156.0	2-12	22193.0	2-48	22230.0	2-12	22267.0	2-48	22304.0	2-12	22341.0	2-48	22378.0	2-12	22415.0	2-48	22452.0	2-12	22489.0	2-48	22526.0	2-12	22563.0	2-48	22600.0	2-12	22637.0	2-48	22674.0	2-12	22711.0	2-48	22748.0	2-12	22785.0	2-48	22822.0	2-12	22859.0	2-48	22896.0	2-12	22933.0	2-48	22970.0	2-12	23007.0	2-48	23044.0	2-12	23081.0	2-48	23118.0	2-12	23155.0	2-48	23192.0	2-12	23229.0	2-48	23266.0	2-12	23303.0	2-48	23340.0	2-12	23377.0	2-48	23414.0	2-12	23451.0	2-48	23488.0	2-12	23525.0	2-48	23562.0	2-12	23599.0	2-48	23636.0	2-12	23673.0	2-48	23710.0	2-12	23747.0	2-48	23784.0	2-12	23821.0	2-48	23858.0	2-12	23895.0	2-48	23932.0	2-12	23969.0	2-48	24006.0	2-12	24043.0	2-48	24080.0	2-12	24117.0	2-48	24154.0	2-12	24191.0	2-48	24228.0	2-12	24265.0	2-48	24302.0	2-12	24339.0	2-48	24376.0	2-12	24413.0	2-48	24450.0	2-12	24487.0	2-48	24524.0	2-12	24561.0	2-48	24598.0	2-12	24635.0	2-48	24672.0	2-12	24709.0	2-48	24746.0	2-12	24783.0	2-48	24820.0	2-12	24857.0	2-48	24894.0</
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Table 6-6 (Cont'd)

[illegible]

3492.5	9.494	42.346	42.500	42.500	3952.5	23.630	127.847	14.741	135.000	4237.5	26.206	168.084	206.704	221.181	178.245	236.576	240.124
3493.5	9.495	42.347	42.500	42.500	3953.5	23.631	127.848	14.742	135.000	4238.5	26.207	168.085	206.705	221.182	178.246	236.577	240.125
3494.5	9.496	42.348	42.500	42.500	3954.5	23.632	127.849	14.743	135.000	4239.5	26.208	168.086	206.706	221.183	178.247	236.578	240.126
3495.5	9.497	42.349	42.500	42.500	3955.5	23.633	127.850	14.744	135.000	4240.5	26.209	168.087	206.707	221.184	178.248	236.579	240.127
3496.5	9.498	42.350	42.500	42.500	3956.5	23.634	127.851	14.745	135.000	4241.5	26.210	168.088	206.708	221.185	178.249	236.580	240.128
3497.5	9.499	42.351	42.500	42.500	3957.5	23.635	127.852	14.746	135.000	4242.5	26.211	168.089	206.709	221.186	178.250	236.581	240.129
3498.5	9.500	42.352	42.500	42.500	3958.5	23.636	127.853	14.747	135.000	4243.5	26.212	168.090	206.710	221.187	178.251	236.582	240.130
3499.5	9.501	42.353	42.500	42.500	3959.5	23.637	127.854	14.748	135.000	4244.5	26.213	168.091	206.711	221.188	178.252	236.583	240.131
3500.5	9.502	42.354	42.500	42.500	3960.5	23.638	127.855	14.749	135.000	4245.5	26.214	168.092	206.712	221.189	178.253	236.584	240.132
3501.5	9.503	42.355	42.500	42.500	3961.5	23.639	127.856	14.750	135.000	4246.5	26.215	168.093	206.713	221.190	178.254	236.585	240.133
3502.5	9.504	42.356	42.500	42.500	3962.5	23.640	127.857	14.751	135.000	4247.5	26.216	168.094	206.714	221.191	178.255	236.586	240.134
3503.5	9.505	42.357	42.500	42.500	3963.5	23.641	127.858	14.752	135.000	4248.5	26.217	168.095	206.715	221.192	178.256	236.587	240.135
3504.5	9.506	42.358	42.500	42.500	3964.5	23.642	127.859	14.753	135.000	4249.5	26.218	168.096	206.716	221.193	178.257	236.588	240.136
3505.5	9.507	42.359	42.500	42.500	3965.5	23.643	127.860	14.754	135.000	4250.5	26.219	168.097	206.717	221.194	178.258	236.589	240.137
3506.5	9.508	42.360	42.500	42.500	3966.5	23.644	127.861	14.755	135.000	4251.5	26.220	168.098	206.718	221.195	178.259	236.590	240.138
3507.5	9.509	42.361	42.500	42.500	3967.5	23.645	127.862	14.756	135.000	4252.5	26.221	168.099	206.719	221.196	178.260	236.591	240.139
3508.5	9.510	42.362	42.500	42.500	3968.5	23.646	127.863	14.757	135.000	4253.5	26.222	168.100	206.720	221.197	178.261	236.592	240.140
3509.5	9.511	42.363	42.500	42.500	3969.5	23.647	127.864	14.758	135.000	4254.5	26.223	168.101	206.721	221.198	178.262	236.593	240.141
3510.5	9.512	42.364	42.500	42.500	3970.5	23.648	127.865	14.759	135.000	4255.5	26.224	168.102	206.722	221.199	178.263	236.594	240.142
3511.5	9.513	42.365	42.500	42.500	3971.5	23.649	127.866	14.760	135.000	4256.5	26.225	168.103	206.723	221.200	178.264	236.595	240.143
3512.5	9.514	42.366	42.500	42.500	3972.5	23.650	127.867	14.761	135.000	4257.5	26.226	168.104	206.724	221.201	178.265	236.596	240.144
3513.5	9.515	42.367	42.500	42.500	3973.5	23.651	127.868	14.762	135.000	4258.5	26.227	168.105	206.725	221.202	178.266	236.597	240.145
3514.5	9.516	42.368	42.500	42.500	3974.5	23.652	127.869	14.763	135.000	4259.5	26.228	168.106	206.726	221.203	178.267	236.598	240.146
3515.5	9.517	42.369	42.500	42.500	3975.5	23.653	127.870	14.764	135.000	4260.5	26.229	168.107	206.727	221.204	178.268	236.599	240.147
3516.5	9.518	42.370	42.500	42.500	3976.5	23.654	127.871	14.765	135.000	4261.5	26.230	168.108	206.728	221.205	178.269	236.600	240.148
3517.5	9.519	42.371	42.500	42.500	3977.5	23.655	127.872	14.766	135.000	4262.5	26.231	168.109	206.729	221.206	178.270	236.601	240.149
3518.5	9.520	42.372	42.500	42.500	3978.5	23.656	127.873	14.767	135.000	4263.5	26.232	168.110	206.730	221.207	178.271	236.602	240.150
3519.5	9.521	42.373	42.500	42.500	3979.5	23.657	127.874	14.768	135.000	4264.5	26.233	168.111	206.731	221.208	178.272	236.603	240.151
3520.5	9.522	42.374	42.500	42.500	3980.5	23.658	127.875	14.769	135.000	4265.5	26.234	168.112	206.732	221.209	178.273	236.604	240.152
3521.5	9.523	42.375	42.500	42.500	3981.5	23.659	127.876	14.770	135.000	4266.5	26.235	168.113	206.733	221.210	178.274	236.605	240.153
3522.5	9.524	42.376	42.500	42.500	3982.5	23.660	127.877	14.771	135.000	4267.5	26.236	168.114	206.734	221.211	178.275	236.606	240.154
3523.5	9.525	42.377	42.500	42.500	3983.5	23.661	127.878	14.772	135.000	4268.5	26.237	168.115	206.735	221.212	178.276	236.607	240.155
3524.5	9.526	42.378	42.500	42.500	3984.5	23.662	127.879	14.773	135.000	4269.5	26.238	168.116	206.736	221.213	178.277	236.608	240.156
3525.5	9.527	42.379	42.500	42.500	3985.5	23.663	127.880	14.774	135.000	4270.5	26.239	168.117	206.737	221.214	178.278	236.609	240.157
3526.5	9.528	42.380	42.500	42.500	3986.5	23.664	127.881	14.775	135.000	4271.5	26.240	168.118	206.738	221.215	178.279	236.610	240.158
3527.5	9.529	42.381	42.500	42.500	3987.5	23.665	127.882	14.776	135.000	4272.5	26.241	168.119	206.739	221.216	178.280	236.611	240.159
3528.5	9.530	42.382	42.500	42.500	3988.5	23.666	127.883	14.777	135.000	4273.5	26.242	168.120	206.740	221.217	178.281	236.612	240.160
3529.5	9.531	42.383	42.500	42.500	3989.5	23.667	127.884	14.778	135.000	4274.5	26.243	168.121	206.741	221.218	178.282	236.613	240.161
3530.5	9.532	42.384	42.500	42.500	3990.5	23.668	127.885	14.779	135.000	4275.5	26.244	168.122	206.742	221.219	178.283	236.614	240.162
3531.5	9.533	42.385	42.500	42.500	3991.5	23.669	127.886	14.780	135.000	4276.5	26.245	168.123	206.743	221.220	178.284	236.615	240.163
3532.5	9.534	42.386	42.500	42.500	3992.5	23.670	127.887	14.781	135.000	4277.5	26.246	168.124	206.744	221.221	178.285	236.616	240.164
3533.5	9.535	42.387	42.500	42.500	3993.5	23.671	127.888	14.782	135.000	4278.5	26.247	168.125	206.745	221.222	178.286	236.617	240.165
3534.5	9.536	42.388	42.500	42.500	3994.5	23.672	127.889	14.783	135.000	4279.5	26.248	168.126	206.746	221.223	178.287	236.618	240.166
3535.5	9.537	42.389	42.500	42.500	3995.5	23.673	127.890	14.784	135.000	4280.5	26.249	168.127	206.747	221.224	178.288	236.619	240.167
3536.5	9.538	42.390	42.500	42.500	3996.5	23.674	127.891	14.785	135.000	4281.5	26.250	168.128	206.748	221.225	178.289	236.620	240.168
3537.5	9.539	42.391	42.500	42.500	3997.5	23.675	127.892	14.786	135.000	4282.5	26.251	168.129	206.749	221.226	178.290	236.621	240.169
3538.5	9.540	42.392	42.500	42.500	3998.5	23.676	127.893	14.787	135.000	4283.5	26.252	168.130	206.750	221.227	178.291	236.622	240.170
3539.5	9.541	42.393	42.500	42.500	3999.5	23.677	127.894	14.788	135.000	4284.5	26.253	168.131	206.751	221.228	178.292	236.623	240.171
3540.5	9.542	42.394	42.500	42.500	4000.5	23.678	127.895	14.789	135.000	4285.5	26.254	168.132	206.752	221.229	178.293	236.624	240.172
3541.5	9.543	42.395	42.500	42.500	4001.5	23.679	127.896	14.790	135.000	4286.5	26.255	168.133	206.753	221.230	178.294	236.625	240.173
3542.5	9.544	42.396	42.500	42.500	4002.5	23.680	127.897	14.791	135.000	4287.5	26.256	168.134	206.754	221.231	178.295	236.626	240.174
3543.5	9.545	42.397	42.500	42.500	4003.5	23.681	127.898	14.792	135.000	4288.5	26.257	168.135	206.755	221.232	178.296	236.627	240.175
3544.5	9.546	42.398	42.500	42.500	4004.5	23.682	127.899	14.793	135.000	4289.5	26.258	168.136	206.756	221.233	178.297	236.628	240.176
3545.5	9.547	42.399	42.500	42.500	4005.5	23.683	127.900	14.794	135.000	4290.5	26.259	168.137	206.757	221.234	178.298	236.629	240.177
3546.5	9.548	42.400	42.500	42.500	4006.5	23.684	127.901	14.795	135.000	4291.5	26.260	168.138	206.758	221.235	178.299	236.630	240.178
3547.5	9.549	42.401	42.500	42.500	4007.5	23.685	127.902	14.796	135.000	4292.5	26.261	168.139	206.759	221.236	178.300	236.631	240.179
3548.5	9.550	42.402	42.500	42.500	4008.5	23.686	127.903	14.797	135.000	4293.5	26.262	168.140	206.760	221.237	178.301	236.632	240.180
3549.5	9.551	42.403	42.500	42.500	4009.5	23.687	127.904	14.798	135.000	4294.5	26.263	168.141	206.761	221.238	178.302	236.633	240.181
3550.5	9.552	42.404	42.500	42.500	4010.5	23.688	127.905	14.799	135.000	4295.5	26.264	168.142	206.762	221.239	17		

Table 6-7 $\int A(\nu) d\nu$ [illegible]

Table 6-7 $\int_2^7 \tilde{A}(v) dv$ (cont'd)[illegible]

SECTION 7

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